Environmental Hazards

Fall 2022

Tuesdays/Fridays, 10:00 AM to 11:15 AM – North Bldg 717

Undergraduate PGEOG 36300-1

Graduate PGEOG 70554-01

Instructor: Enrique Lanz Oca
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Office Hours: Tuesdays, 11:30am – 12:30pm

Course Description: On November 1st, 1755, Lisbon was devastated by one of the deadliest earthquakes in centuries. Twenty-meter high tsunamis swept the city, annihilating at least 60,000 people. From Greenland to the British Isles, to Scandinavia, Morocco, Spain, and the Caribbean islands, millions of people witnessed this unprecedented telluric event. Such was its impact that Europeans began to see Nature as an unstable and hazardous agency, driving the foundations of seismology. Through similar cases such as the Tambora volcanic eruption in Indonesia and the Chernobyl nuclear accident in the former Soviet Union, this course will introduce you to some of the main geophysical/technological phenomena that create these environmental hazards. You will acquire a solid knowledge of the tectonic system, earthquakes, hurricanes, cliff recession as well as technological catastrophes such as dam failures, oil spills, and nuclear power station accidents. Ecological disasters, as you will see, do not equally impact every population or socio-economic group. Minorities, indigenous groups, and the poor are often exposed to the highest risks.
You will hone your critical-thinking skills as you learn to connect natural and manmade disasters to their cultural, technological, socio-economic, political, and gendered values. Finally, you will become aware of how humans have become one of the main forces of Nature, a process that is causing a planetary ecological crisis with extraordinary consequences such as the increase of the global temperature, the flood of extensive coastal areas, the intensification of meteorological phenomena, changes of the ecosystems, and the massive displacement and extinction of millions of living organisms.

Modus Operandi of the Class:

The class will be **"in-person."** However, in case of an emergency, we may switch to virtual 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:

1. This course is designed to introduce you to the local, regional, national, and global implications of geophysical processes and anthropogenic activities that cause or have the potential to generate hazardous conditions in the ecosystems.

2. You will study how local, regional, national, and international organizations have responded to hazardous situations and thereby learn about mechanisms of predicting, monitoring, preventing, and remediating potential environmental or technological risks.

3. You will be guided in forming an independent study on environmental/technological hazards at the local, regional, national, or international levels to enhance your perception of the important role of our collective responsibility towards a sustainable future.

Learning Outcomes

1 Students will 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 Students will acquire knowledge of the Earth's key trends in climate and environmental issues in their socio-political context.

3 Students will 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 Students will 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. Students will 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. Spatial dimensions of systemic racism and other types of oppression. Students will apply geographic methods to analyze the spatial 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 geographic and environmental knowledge and skills to advance social justice and sustainability.

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 Report	10% 5%	-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 1 (Class Participation)	5% 5%	
PARTICIPATION 2: *Eco*Credits Report/s	5% 5%	-At least 1 Extra-Class Activities 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, Group Work (Report) and EcoCredits.
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:
August 26h (Friday): Presentation, Syllabus, and Environmental Hazards
1. Course Presentation
2. Description of the Syllabus
2. What is an Environmental Hazard?
3. Environmental Justice and Hazards
Required Materials:

-Chapter 1: "Natural Hazards and Disasters." *Natural Hazards & Disasters* by Donald Hyndman and David Hyndman. Brooks/Cole

-FEMA (2022). "Natural Hazards." Available at https://hazards.fema.gov/nri/natural-hazards#:~:text=Natural%20hazards%20are%20defined%20as,hazards%2C%20such%20as%20manmade%20hazards.

-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

-Slovak (1987). "Perception of Risk." *Science*, Vol. 236, issue 4799 (April 17), pp.: 280-285

Further Materials:

-European Commission (2022). "Natural and Man-Made Hazards." Available at https://joint-research-centre.ec.europa.eu/scientific-activities-z/natural-and-man-made-hazards_en

Week 2:
August 30th (Tuesday): Tectonic Plates, Their Dynamics, and Male Science
1. Earth's Internal Structure
2. Tectonic Plates Dynamics
3. Marie Thurp: Tectonics and the Scientific Marginalization of Women
4. Proposal (Phase 1): Selecting a Research Topic (objectives)
Required Materials:

-Blakemore, Erin (2016). "Seeing Is Believing: How Marie Tharp Changed Geology Forever." *Smithsonian Magazine* (August 30). Available on https://www.smithsonianmag.com/history/seeing-believing-how-marie-tharp-changed-geology-forever-180960192/

-Chapter 2: "Plates Tectonics and Physical Hazards."

September 2nd (Friday): NO CLASS

Week 3:
September 6th (Tuesday): Volcanoes and Their Hazardous Processes
1. Volcanism and Its Hazards
2. Cases: Tonga Eruption (2022): Unprecedented Volcanic Episode
3. Proposal (Phase 2): Construction of the Research Questions/Focus

Required Materials:

-Chapter 6: "Volcanoes: Tectonic Environments and Eruptions."

-Chapter 7: "Volcanoes, Hazards, and Mitigation."

-Witze, Alexandra (2022). "Why the Tongan Volcanic Eruption Was so Shocking?" *Nature*, Vol. 602, Feb. 17. Available at https://media.nature.com/original/magazine-assets/d41586-022-00394-y/d41586-022-00394-y.pdf

Further Materials:

-"A Day in Pompeii - Full-length animation" (video). Available at https://www.youtube.com/watch?v=dY_3ggKg0Bc

September 9th (Friday): Earthquakes and Their Hazardous Processes
1. Earthquakes and their Mechanics
2. Earthquakes: their Forecast, Prevention, and Mitigation 2
3. Proposal (Phase 3): Methodology (Data collection)
4. Group Work (phase 1): Making the Groups and Topic Selection

Required Materials:

-Chapter 3: "Earthquakes and their Causes."

-Chapter 4: "Earthquakes Predictions, Forecasts, and Mitigation."

Week 4:
September 13th (Tuesday): Tsunamis
1. What is a Tsunami?
2. Causes and Consequences
3. Monitoring/Forecast and Prevention
4. Proposal (Phase 4): Literature Review and Intellectual Contribution

Required Materials:

-Chapter 5: "Tsunamis."

-National Geographic (2011). "Rare Video: Japan Tsunami | National Geographic" [video]. Available at https://www.youtube.com/watch?v=oWzdgBNfhQU

September 16th (Friday): Extraterrestrial Hazards: Asteroids and Comets
1. Asteroids, Comets, and Extinction
2. Historical Cases: Tunguska (1908) and Chelyabinsk events (2013) (Russia)
3. Geomagnetic Solar Storms

Required Materials:
-ABC News (2013). "Meteor Strikes Russia, Over 1,000 Believed Injured" [video]. Available on https://www.youtube.com/watch?v=gRrdSwhQhY0

-Chapter 17: "Asteroid and Comet Impact."

-NASA (2008). "The Tunguska Impact-100 Year Later." Available at
https://science.nasa.gov/science-news/science-at-nasa/2008/30jun_tunguska

-*Phys.org*
a. (2021). "The 27.5-million-year cycle of geological activity" (June 18). Available on https://phys.org/news/2021-06-million-year-geological.html
b. (2022). "Solar storm to hit Earth's magnetic field on July 21." Available at https://phys.org/news/2022-07-solar-storm-earth-magnetic-field.html

Week 5:
September 20th (Tuesday): Climate Change: Facing the *Unknown*
1. What is that so-called Climate Change, Global Warming, and Greenhouse Effect?
2. Causes of Climate Change
3. Brief Summary of the Main Consequences
4. Human Communities Relocation
Required Materials:
-Chapter 11: "Climate Change."

-Lincoln Institute (2022). "Uprooted: As the Climate Crisis Forces U.S. Residents to Relocate, A New Conversation Emerges." Available at https: www.lincolninst.edu

-United Nations (UN) (2021). "Climate Change and Weather Related to Disasters Surge Five-Over 50 years, but Early warnings Save Lives-WMO Report." Available at

September 23rd (Friday): Mass Movement and Hazards: Landslides
-PROPOSAL of the Research Paper DUE
1. Mass Movement: from Landslides to Mudflows
2. Prevention and Mitigation Mechanisms
3. Landslide Dams: Hattian Bala Landslide (Kashmir)
4. Landslide case: Himachal Pradesh (Indian Himalayas)
Required Materials:
-Chapter 8: "Landslides and Other Downslope Movement." *Natural Hazards & Disasters* by Donald Hyndman and David Hyndman. Brooks/Cole

-*Floodlist* (2022). "India – Floods and Landslides Cause Fatalities in Himachal Pradesh." Available at https://floodlist.com/asia/india-floods-himachal-pradesh-july-2022

-Niaz, Fawad S. et al. (2020). "Lessons from the Case History of a Massive Landslide Dam." *GeoFluids* (Nov. 30). Available at https://www.hindawi.com/journals/geofluids/2020/8840629/ (Read just the Introduction).

Further Materials:

-"Amazing Flash Flood/Debris Flow Southern Utah HD." Available at https://www.youtube.com/watch?v=_yCnQuILmsM&t=240s

-Associated Press (2018). "Raw: Massive Mud Flow Swallows Desert Road." [Video]. Available on https://www.youtube.com/watch?v=K1ODt3fNgZg

-National Geography (2007). "Landslides." [Video]. Available at https://www.youtube.com/watch?v=mknStAMia0Q

Week 6:

September 27th (Tuesday): NO CLASS

September 30th (Friday): Heat Waves

1. What is a Heatwave?
2. Heatwaves and Cities:
   -Sevilla (Spain), Zoe and the First Heatwave named
   -Richmond (USA)
   -New York City (USA)

Required Materials:

-ArcGIS (2021). "Heat Vulnerability in NYC." Available at https://www.arcgis.com/home/item.html?id=baa7adc3aa8140d0b610fbf39901799b

-Einhorn, Catrin (2021). "What Technology Could Reduce Heat Deaths? Trees." (July 2). Available at https://www.nytimes.com/2021/07/02/climate/trees-cities-heat-waves.html

-Millan, Laura (2022). "One of Europe's Hottest Cities Is Using 1,000-Year-Old Technology to Combat Climate Change." *Bloomberg* (August 18). Available at https://www.bloomberg.com/news/articles/2022-08-18/one-of-europe-s-hottest-cities-has-a-climate-change-battle-plan

-Osborne, Margaret (2022). "'Zoe' Becomes the World's First Named Heat Wave." *Smithsonian* (August 2). Available at https://www.smithsonianmag.com/smart-news/zoe-becomes-the-worlds-first-named-heat-wave-180980512/

-Plumer, Brad and Popovich, Nadja (2020). "How Decades of Racist Housing Policy Left Neighborhoods Sweltering." *The New York Times* (August 24). Available on https://www.nytimes.com/interactive/2020/08/24/climate/racism-redlining-cities-global-warming.html

-*Union of Concerned Scientists* (2018). "Heat Waves and Climate Change." Available at https://www.ucsusa.org/resources/heat-waves-and-climate-changeutm_source=googlegrants&utm_medium=search&utm_campaign=CE&gclid=Cj0KCQjw3eeXBhD7ARIsAHjssr8DBjB1qErDIIEbbo5QiSWugys3Yp43MmAzT6RZ75FjL0Rs5CaDgHIaAjREEALw_wcB

Further Materials:

-La Cartuja Qanat Project (2022). Available at https://www.pctcartuja.es/en/proyecto/cartuja-qanat

Week 7:

October 4th (Tuesday): NO CLASS

October 7th (Friday): Drought

1. What is drought?
2. Drought and Climate Change
3. Cases:
    a. The Neo-Assyrian Empire Collapse
    b. The American West Drought
    c. Europe

Required Materials:

-IFAB (2022). "2022 European Drought." Available at https://www.ifabfoundation.org/2022/06/10/2022-european-drought/

-Henley, Jon (2022). "Europe's rivers run dry as scientists warn drought could be worst in 500 years." *The Guardian* (August 13). Available at https://www.theguardian.com/environment/2022/aug/13/europes-rivers-run-dry-as-scientists-warn-drought-could-be-worst-in-500-years

-*New York Times* (2022).

a."How Bad Is the Western Drought? Worst in 12 Centuries, Study." Finds." (Feb. 14). Available at https://www.nytimes.com/2022/02/14/climate/western-drought-megadrought.html?action=click&module=RelatedLinks&pgtype=Article

b. As the Great Salt Lake Dries Up, Utah Faces An 'Environmental Nuclear Bomb' (June 9). Available at https://www.nytimes.com/2022/06/07/climate/salt-lake-city-climate-disaster.html

-Sinha, A. et al. (2019). "Role of climate in the rise and fall of the Neo-Assyrian Empire." *Sci. Adv.* 2019; 5 (13 November).

Saturday, October 8th: Ecological Tour: from Central Park to Grand Central Terminal
(See the section "Participation" on Appendix 1)

Week 8:
October 11th (Tuesday): Wildfires
1. What is a Wildfire?
2. Causes and Consequences:
3. Australia's Fires
4. The Arctic and the *Zombi Fires*
5. Traditional Knowledge and Wildfires Prevention

Required Materials:

-Chapter 16, "Wild Fires" pages (488-492)

-Hood. Marlowe (2020). "Scientists warn of 'zombie fires' in the Arctic." *phys.org* (May 27). Available at https://phys.org/news/2020-05-scientists-zombie-arctic.html

-Irfan, Umair (2021). "We must burn the West to save it." *Vox* (July 13). Available on https://www.vox.com/21507802/wildfire-2020-california-indigenous-native-american-indian-controlled-burn-fire

-Woodward, Aylin (2020). "Australia's fires are 46% bigger than last year's Brazilian Amazon blazes. There are at least 2 months of fire season to go." *Business Insider* (Jan. 8). Available at https://www.businessinsider.com/australia-fires-burned-twice-land-area-as-2019-amazon-fires-2020-1/amp/

Further Materials:

-*The New York Times* (2021). "Wildfires Are Intensifying. Here's Why, and What Can Be Done." (July 16). Available on https://www.nytimes.com/2021/07/16/climate/wildfires-smoke-safety-questions.html

October 14th (Friday): Sea Level Rising
1. Causes: Sea Level Rising, Storm Surge, and High-Tide-Storm
2. Consequences: Land loss and salinization
3. Mitigation Strategies

Required Materials:

-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

-NOAA (2022). "Climate Change: Global Sea Level." Available at https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level

-*The New York Times*
(2019). "Rising Seas Will Erase More Cities by 2050, New Research Shows." (Oct. 29). Available on https://www.nytimes.com/interactive/2019/10/29/climate/coastal-cities-underwater.html

-Tam, Laura (2009). "Strategies for Managing Sea Level Rise." Available on http://www.spur.org/publications/urbanist-article/2009-11-01/strategies-managing-sea-level-rise

Week 9:
October 18th (Tuesday): Conversations and Updates of:
1. Group Work Report
2. Final Research Paper

October 21st (Friday): MID-TERM Exam

Week 10:
October 25th (Tuesday): Permafrost and its Hazards
1.What is the Permafrost?
2. Permafrost and the Arctic Infrastructure Collapse
3. Permafrost and Greenhouse gases
4. Diseases and Permafrost
Required Materials:
-*Advancing Earth and Space Science* (AGU) (2021). "How Much of the Earth's Surface is Underlain by Permafrost?" Available at https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2021JF006123

-Dobrovidova, Olga (2022). Russia's new permafrost monitoring system could improve climate models, protect infrastructure." *Science* (Jan. 4). Available at https://www.science.org/content/article/russia-s-new-permafrost-monitoring-system-could-improve-climate-models-protect

-Moskvitch, Katia (2014). "Mysterious Siberian crater attributed to methane." *Nature* (July 31).

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

October 28th (Friday): Hurricanes/Typhoons/Cyclones
1. Formation and Development
2. Consequences: Flood, waves, wind, and storm surge
3. Case: Hurricane Katrina and New Orleans
4. Coastal vegetation: Mangroves and Hurricanes

Required Materials:
-Chapter 15 “Hurricanes and Nor’Easters.”

-Del Valle, Alejandro et al. (2020). “Mangroves protect coastal economic activity from hurricanes.” *PNAS* (Jan. 7).

-Lehmann, Nicholas (2020). “Why Hurricane Katrina Was Not a Natural Disaster.” *The New Yorker* (August 26). Available on https://www.newyorker.com/books/under-review/why-hurricane-katrina-was-not-a-natural-disaster

Further Materials:

-Micheals, Samantha (2015). “Maps: 10 Years After Katrina, NOLA’s Poor Neighborhoods Are Still Largely Abandoned.” *MotherJones* (August 10). Available on https://www.motherjones.com/politics/2015/08/maps-10-years-after-hurricane-katrina-uneven-recovery-new-orleans/

Week 11:
November 1st (Tuesday): From Tornadoes to Super Storms
1. Tornadoes
2. Thunderstorms and Lightning
3. Cold Waves. Case: Texas Feb. 2021
4. California’s Atmospheric Rivers and the Super Storms

Required Materials:
-Chapter 10: “Weather, Thunderstorm, and Tornadoes.”

-Columbia Climate School (2021). “How Unprecedented Was the February 2021 Texas Cold Snap?” Available at https://news.climate.columbia.edu/2021/03/16/unprecedented-texas-cold-snap/

-FEMA (2022). “Cold Wave.” Available at https://hazards.fema.gov/nri/cold-wave

-National Weather Service and NOOA (2022). “National Weather Service Lightning Fatalities in 2022: 14.” Available at https://www.weather.gov/safety/lightning-fatalities

-Zhong, Raymond (2022). “The Coming California Megastorm.” *New York Times* (August 12). Available at https://www.nytimes.com/interactive/2022/08/12/climate/california-rain-storm.html

Further Materials:
-Oxenden, McKenna (2022). “Lightning Strike Near White House Kills 3.” The new York Times (August 4). Available at https://www.nytimes.com/2022/08/04/us/white-house-lightning.html?action=click&module=RelatedLinks&pgtype=Article

November 4th (Friday): Floods:
1. Watersheds and the riparian ecosystems
2. Floods, Causes, and Flood Control Mechanisms
3. Germany 2021: A 1,000-Year Flood Scenario
Required Materials:
-Chapter 12: "Streams and Flood Processes."

-Chapter 13: "Floods and Human Interactions" (pages 364-368 and 375-381)

-"The Extent of Flooding in the Hardest-Hit Areas of Europe." *The New York Times*, July 17, 2021. Available on https://www.nytimes.com/interactive/2021/07/17/world/europe/europe-flood-map.html?action=click&module=Spotlight&pgtype=Homepage

-"Climate scientists shocked by scale of floods in Germany." *The Guardian*, July 16, 2021. man Available on https://www.theguardian.com/environment/2021/jul/16/climate-scientists-shocked-by-scale-of-floods-in-germany

Further Materials:
-Tellman, B. et al. (2021). Satellite imaging reveals increased proportion of population exposed to floods." *Nature* (August 5).

-*The Guardian* (2022). "Record Death Valley flooding 'a once-in-1,000-year event.'" (August 10). Available at https://www.theguardian.com/us-news/2022/aug/10/death-valley-floods-climate-crisis

Week 12:
November 8th (Tuesday): Dam Infrastructure and Hazards
1. Dams, Types, and Construction
2. Current Status of Dam Infrastructure in United States
3. Dam and Their Hazards: From the Vajont to the Oroville Dam Disasters
Required Materials:
-Association of State Dam Safety Officials (2019). "Dam Failures and Incidents." Available on https://damsafety.org/dam-failures

-"A Timeline of Oroville Events-2017." [Video]. Available on https://www.youtube.com/watch?v=NjbbW37qzak&t=4s

-OVO (n. d.). "The Vajont Disaster" [video]. Available at http://www.ovovideo.com/en/vajontdisaster/

-Pupovac, Jessica (2015). "Aging and Underfunded: America's Dam Safety Problem, In 4 Charts." *NPR*, WNYC Radio (Oct. 11). Available at http://www.npr.org/

2015/10/11/447181629/aging-and-underfunded-americas-dam-safety-problem-in-4-charts

-Smith, Laura (2017). "The deadliest structural failure in history killed 170,000—and China tried to cover it up." Timeline. Available at https://timeline.com/structural-failure-banqiaochina-7a402a25bb65

-United States Society on Dams (2020). "Types of Dams." Available at https://www.ussdams.org/dam-levee-education/overview/types-of-dams/

-Zhong, Raymond (2022). "The Coming California Megastore." *New York Times* (August 12). Available at https://www.nytimes.com/interactive/2022/08/12/climate/california-rain-storm.html

November 11th (Friday): Conversations and Updates of:

1. Group Work Report
2. Final Research Paper

Week 13

November 15th (Tuesday): Nuclear Energy

1. What is Nuclear Energy? Fission, Fusion, and Radioactivity
2. Nuclear Accidents: From Chernobyl (1986) to Fukushima (2011)
3. Ukraine's War and the Zaporizhzhia Plant Scenario
4. Nuclear and the Indigenous Groups: Navajos and the Marshall Islands

Required Materials

-Reisser, Wesley and Reisser, Colin (2019). Chapter 6, "Nuclear Power" in *Energy Resources: From Science to Society*

-Rust, Suzanne (2020). "U.S. says leaking nuclear waste dome is safe; Marshall Islands leaders don't believe it." *The Angeles Times* (July 1). Available on https://www.latimes.com/environment/story/2020-07-01/us-says-nuclear-waste-safe-marshall-islands-runit-dome

-Spanne, Autumne. "Uranium Pervades homes on a near Navajo Nation." *HighCountryNews* (August 27, 2017). Available at https://www.hcn.org/articles/pollution-epa-budget-cuts-threaten-to-slow-uranium-cleanup-at-navajo-nation

-*The Guardian* (2022). "Strikes at Ukrainian nuclear plant 'alarming', says UN watchdog chief." Available at https://www.theguardian.com/world/2022/aug/06/strikes-at-ukrainian-nuclear-plant-alarming-says-un-watchdog-chief

Further Materials:

-"Nuclear Reactor - Understanding how it works" (video). Available at

https://www.youtube.com/watch?v=1U6Nzcv9Vws

November 18th (Friday): Petroleum and its Hazards
FINAL RESEARCH PAPER DUE
1. Basics: Formation, types, qualities, and Landscape
2. Hydraulic Fracturing (fracking)
3. Oil Spills
    Case: The Greenpoint Oil Spill

Required Materials:

-Meng, Qingmin (2017). "The impacts of fracking on the environment: A total environmental study paradigm." *Science of the Total Environment* 580: 953–957

-Newtown Creek Alliance (2016). "Green point Oil Spill." Available on http://www.newtowncreekalliance.org/greenpoint-oil-spill/

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

-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/

-University of Michigan Engineering (2012). "The Impact of fracking." [Video]. Available at https://www.youtube.com/watch?v=YAgl8qTtotc

Week 14
November 22nd (Tuesday): Industrial and Infrastructure Hazards
1. Waste Disposal and Hazards: The Love Canal Disaster, NY
2. Industrial Hazards: Bhopal, India (1984)
3. Hydraulic Projects and their Hazards: The Aral Sea Disaster

Required Materials:

-BBC (2015). "Aral Sea: The sea that dried up in 40 years." [Video]. Available at https://www.youtube.com/watch?v=5N-_69cWyKo

-Mandavilli, Apoorva (2018). "The World's Worst Industrial Disaster Is Still Unfolding." *The Atlantic* (July 10). Available at https://www.theatlantic.com/science/archive/2018/07/theworlds-worst-industrial-disaster-is-still-unfolding/560726/

-"The Love Canal Disaster: Toxic Waste in the Neighborhood - Retro Report." *The New York Times* [video]. Available at https://www.youtube.com/watch?v=Kjobz14i8kM

November 25th (Friday): NO CLASS; THANKSGIVING

Week 15
November 29th (Tuesday): *The Electric Grid Infrastructure: A Risky Dependency*
***Eco*Credits Report Project/s and Group Work Report DUE**
1. Understanding the Electric Grid
2. Electric Outages: Causes and Main Consequences
3. Cases: From Texas (2021) to NYC

Required Materials:

-Dominianni, Christine et al. (2018). "Health Impacts of City wide and Localized Power Outages in New York City." *Environmental Health Perspectives,* June 11, Vol. 126, N. 6. Available on https://doi.org/10.1289/EHP2154

-"How Does the Power Grid Work?" [Video]. Available at https://www.youtube.com/watch?v=IZz4sR5vfeo

-Irfar, Umair (2021). "Why every state is vulnerable to a Texas-style power crisis." *Vox*. Available at https://www.vox.com/22308149/texas-blackout-power-outage-winter-uri-grid-ergot

Further Materials:

-*The New York Times* (2012). "In New York's Public Housing, Fear Creeps In With the Dark." (Nov. 2). https://www.nytimes.com/2012/11/03/nyregion/in-public-housing-after-hurricane-sandy-fear-misery-and-heroism.html#:~:text=The%20storm%20cut%20off%20water,at%20the%20nearest%20fire%20hydrant.

-US Department of Energy (n. d.). "Infographic: Understanding the Grid." Available at https://www.energy.gov/articles/infographic-understanding-grid

December 2nd (Friday): Presentation and Exhibition of the *Eco*Credits Report Project/s

Week 16
December 6th (Tuesday): Presentation of the GROUP WORK: Natural/Technological Hazards Case in New York City

December 9th (Friday): Presentations 1 (Research Paper)

Week 16:
December 13th (Tuesday): Presentations 2 (Research Paper)

December 19th (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 (evidence), 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 and the final paper. 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 (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).

Possible Scheme of the Report:
1. Background
2. Identification of the Problem
3. Consequences
4. Possible Solutions
5. Methodology
6. References

Elaborate a **Report** of at least between **1-2 pages** 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?

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: Class Participation and *Eco*Credits
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. *Eco*Credits: Outdoor Participation:
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 ***Eco*Credits**. The bigger the number of outdoor activities, the bigger the amount of *Eco*Credits will be. However, every student will have to participate **at least in one** of these extra-class outdoor activities in order to obtain a 5% of the final grade. If you complete more than 1 activity, you will receive more *Eco*Credits that will be transformed into extra-credit. 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.

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.

1st 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