

Environmental Hazards

Fall 2020

Tuesdays/Fridays, 09:45 AM to 11:00 PM – HN 1022

Undergraduate PGEOG 36300-1

Graduate PGEOG 70554-01

Instructor: Enrique Lanz Oca
Office: Virtual
E-mail: enriquelanzoca@gmail.com
Office Hours: Tuesdays, 11:15am – 12:15pm (via Zoom)
(Make an appointment to talk with the instructor through Zoom; however, you can e-mail the instructor whenever you wish.).

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.

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.

Modus Operandi for the Class:

The course will be a “**mixed**” course of “synchronous” and “asynchronous” activities.

1. Class/Lecture/Discussion Period: “Synchronous”

- The class will be **synchronous** (via Zoom).
- Although the attendance to the virtual class is not a main requirement, I recommend you to attend, since the discussion could be crucial in the development of the course.
- I will send a copy of the recorded class after every class.
- The class is OPEN, that is, you can invite other people to join us
- Zoom Join Code Information: You can find here the Zoom Join Codes for the first three days of class:
 - a. Friday, August 28:

<https://pratt.zoom.us/j/97007107158?pwd=Zkh5YU9heW5ncFFPWFR0ZkxTV25DQT09>

b. Tuesday, September 1:

<https://pratt.zoom.us/j/95987336533?pwd=WjBERmRwU0taV1htaFBLGhEVDVvQT09>

c. Friday, September 4:

<https://pratt.zoom.us/j/98104747290?pwd=c29NckRtdk8zaDVVbDVSyVd6UzVOdz09>

I will send you the rest of Zoom Join Codes every week (check in Announcements (Blackboard)).

-Protocol of Zoom communication Class: Although not a total requirement, the camera should be “**ON**” during the class.

2. Discussion Board: “**Asynchronous**”

-Every week I will post a few questions related to the week’s main topics (e. g. nuclear reactors).

-All of us will have to answer and discuss those questions on this Blackboard section.

-These questions **will substitute** the Mid-Term and Final Exams.

-Period to answer: from Saturday (12:00am) to Monday (12:00am) of every week

-Discussion Board Rubric Scale: from 0 to 4

Level	Rubric
Provocative	4
Sustantial	3
Standard	2
Weak	1
Incorrect	0

-This course is connected to the Greenbelt Society. You can find more information at greenbeltsociety.wordpress.com. You can participate in diverse activities or join us.

Assignments:

Depending on your status as undergraduate or graduate, you will be expected to complete the following assignments:

Undergraduate Students

1. Final research paper

- Around 8 pages (~2,000 words)
- at least 5 references

2. Research paper proposal (~2 pages)

3. Discussion Board Questions

(see above for more details)

4. Oral presentation of your research paper (5 minutes)

Graduate Students

1. Final research paper

- Around 10 pages
- at least 10 references

2. Research paper proposal (~3 pages)

3. Abstract of the research paper:

Extra-credit (250 words plus keywords)

4. Discussion Board Questions

(see above for more details)

5. Oral presentation of your research paper (5-10 minutes)

5. Elaboration of a Poster
(Conference: Poster of the Research Paper)

6. Elaboration of a Poster
(Conference: Poster of the Research Paper)

Evaluation:

1. Undergraduate student grades will be based upon the following:

	Percentage of Final Grade
Proposal of the Research paper	25%
Final Research Paper	35%
Discussion Board Questions	25%
Oral Presentation (Research Paper)	5%
Elaboration of a Poster (Group activity)	10%

2. Graduate student grades will be based upon the following:

	Percentage of Final Grade
Proposal of the Research paper	25%
Final Research Paper	35%
Discussion Board Questions	25%
Oral Presentation (Research Paper)	5%
Elaboration of a Poster (Group activity)	5%
Abstract (Research Paper)	5%

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/>.

Readings:

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.

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>

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 Contents and Calendar:

Part I: Course Introduction

August 28th (Friday):

1. Syllabus Presentation and the Description of the Assignments
2. “Checking Meeting”: Becoming Familiar with the Course

Part II: Science, Traditional Knowledge, Hazards, and Environmental Racism

Week 2:

September 1st (Tuesday):

1. What are Science and the Scientific Method?
2. Testing a Theory: “The String Theory”
3. Scientific Perspectives of Nature
4. Science and the Traditional Knowledge

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>
- Ellis, George (2014). "Defend the Integrity of Physics." *Nature* (Dec. 18/25), Vol. 516, pp.: 321-323
- 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>
- Prothero, Donald R. and Dott, Jr., Robert H. (2002). Chapter 2 "Foods, Fossils, and Heresies" in *Evolution of the Earth* (Sixth edition) (read pages 25-36)

September 4th (Friday): Hazards, Knowledge, and Environmental Racism

1. What is a Hazard?
2. Hazard: Science, Perception, and Traditional Knowledge
3. Hazard Management and Environmental Principles
4. Environmental Racism and Hazards

Required Materials:

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

- Kaufman, Leslie (2012). "Wind Turbines and Health Hazards." *The New York Times* (Jan. 18). Available at <https://green.blogs.nytimes.com/2012/01/18/wind-turbines-and-health-hazards/>
- The Lisbon Earthquake in "The Engines of Our Ingenuity: No. 1964: Lisbon Earthquake" by Rob Zaretsky. Available at <http://www.uh.edu/engines/epi1964.htm>

Part III: Earth's Internal and External Structure, Volcanism, and Earthquakes

Week 3:

September 8th (Tuesday): Tectonic Plates, Their Dynamics, and Male Science

1. Earth's Internal Structure
2. Tectonic Plates Dynamics
3. Marie Tharp: Tectonics and the Scientific Marginalization of Women

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: "Tectonic Plates and Physical Hazards."

September 11th (Friday): Tectonics and Volcanoes

1. Volcanism and Its Hazards
2. Cases: Mount Pelee, Saint Pierre (Martinique) and Political Elections (1902)

Required Materials:

- Chapter 6: "Volcanoes: Tectonic Environments and Eruptions."
- Chapter 7: "Volcanoes, Hazards, and Mitigation."
- McKie, Robin (2002). "Three minutes of horror when 30,000 perished." *The Guardian* (April 28). Available on <https://www.theguardian.com/world/2002/apr/28/physicalsciences.highereducation>

Further Materials:

- "A Day in Pompeii - Full-length animation" (video). Available at https://www.youtube.com/watch?v=dY_3ggKg0Bc
- The Christian Science Monitor (2018). "With few choices, the poor take risk in volcano's path." Available on <https://www.csmonitor.com/World/Americas/2018/0608/With-few-choices-the-poor-take-risk-in-volcano-s-path>

Week 4:

September 15th (Tuesday): Tectonics and Earthquakes

1. Earthquakes and their Mechanics
2. Earthquakes: their Forecast, Prevention, and Mitigation 1

Required Materials:

- Chapter 3: "Earthquakes and their Causes."
- Chapter 4: "Earthquakes Predictions, Forecasts, and Mitigation."

September 18th (Friday): NO CLASS

Week 5:

September 22nd (Tuesday):

1. Earthquakes: their Forecast, Prevention, and Mitigation 2
2. Tsunamis
3. Invited Speaker: Carrie Garrison-Laney (Hazards Specialist in Tsunamis; College of Environment, University of Washington)

Required Materials:

- Chapter 4: "Earthquakes Predictions, Forecasts, and Mitigation."
- Chapter 5: "Tsunamis."
- National Geographic (2011). "Rare Video: Japan Tsunami | National Geographic" [video]. Available at <https://www.youtube.com/watch?v=oWzdgBNfhQU>

PART IV: Atmospheric Hazards and Wild Fires

September 25th (Tuesday): Hurricanes/Typhoons/Cyclones

1. Formation and Development
2. Consequences: Flood, waves, wind, and storm surge
3. Case: Hurricane Katrina and New Orleans

Required Materials:

-Chapter 15 “Hurricanes and Nor’Easters.”

-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 6:

September 29th (Tuesday): NO CLASS; classes follow a Monday schedule

October 2nd (Friday): Atmospheric Disturbances and Wild Fires

1. Atmospheric Dynamics: from Fronts to Thunderstorms
2. Tornadoes: Mark Dempsey (Invited Speaker)
3. Wild Fires

Required Materials:

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

-Chapter 16: “Wild Fires.”

-The New York Times (2020). “California Fires Live Updates: 2 Blazes Among State’s Largest Ever.” Available on <https://www.nytimes.com/2020/08/22/us/california-wildfires.html>

Further Materials:

-Nicas, Jack and Fuller, Thomas (2018). “Wildfire Becomes Deadliest in California History.” *The New York Times* (Nov. 12). Available at <https://www.nytimes.com/2018/11/12/us/california-fires-camp-fire.html>

PART V: Hydrospheric Hazards

Week 7:

October 6th (Tuesday): Streams and Floods:

1. Watersheds and the riparian ecosystems
2. Floods, Causes, and Flood Control Mechanisms
3. Case: Jökulhlaups

Required Materials:

-Chapter 12: “Streams and Flood Processes.”

- Chapter 13: “Floods and Human Interactions” (pages 364-368 and 375-381)
- “Eyjafjallajökull glacial flood (jökulhlaup) April 14th 2010.” Youtube [Video]. Available at <https://www.youtube.com/watch?v=fJII-u-41Lg>

October 9th (Friday):

PAPER PROPOSAL DUE

1. Coastal Geomorphology, Ocean Processes, and Human Interference
2. Coastal Recovery Methods
3. Mangrove Ecosystem
Case: The Sundarbans (Bangladesh)

Required Materials:

- Chapter 14: “Waves, Beaches, and Coastal Erosion.”
- Ganguly, Meenakshi. (2020.)“Bangladesh Coal Plants Threaten World’s Largest Mangrove Forest.” Human Right Watch (June 18). Available on <https://www.hrw.org/news/2020/06/18/bangladesh-coal-plants-threaten-worlds-largest-mangrove-forest>
- UNESCO, World Heritage Centre (2016). “The Sundarbans.” Available at <http://whc.unesco.org/en/list/798>

Further Materials:

- Harvey, Chelsea (2016). “A new power plant could devastate the world’s largest mangrove forest.” *The Washington Post* (July 18th). Available at <https://www.washingtonpost.com/news/energy-environment/wp/2016/07/18/a-new-power-plant-could-devastate-the-worlds-largest-mangrove-forest/>

Week 8:

Part VI: Mass Movement and Hazards

October 13th (Tuesday): Landslides

1. Mass Movement
2. What are Landslides?
3. Hazards, Prevention, and Mitigation
4. Case: Rio de Janeiro’s Favelas and Landslides

Required Materials:

- Chapter 8: “Landslides and Other Downslope Movement.”
- RioOnWatch* (2020). “Favelas and Landslide Risk: If They Know Their Homes Might Collapse, Why Do They Build There?” Available on <https://www.rioonwatch.org/?p=51579>

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>

Part VII. Environmental/Technological Hazards

October 16th (Friday): Waste Hazards, Industrial/Water Disasters

1. Waste Disposal and Disasters: The Love Canal Disaster, NY
2. Industrial Disasters: Bhopal, India (1984)
3. Water Infrastructure Collapse: Flint, Michigan
4. Water Technological Dreams: 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
- Denckack, Melissa (2018). "Flint Water Crisis: Everything You Need to Know." *Natural Resources Defense Council (NRDC)*. (Nov. 8). Available at <https://www.nrdc.org/stories/flint-water-crisis-everything-you-need-know>
- 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/the-worlds-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>

For more details about Waste Issues, see:

- Chapter 12: "Waste Disposal" in *Geohazards: Natural and Human* by Nicholas K. Coch (1995)

Week 9:

October 20th (Monday): Coal and Its Hazards 1

1. Geological Formation
2. Types of Coal and Its Physical Qualities
3. The Coal Landscape: from the Mine to the Power Station

Required materials:

- "How a coal power station works." [Video]. Available at https://www.youtube.com/watch?v=SeXG8K5_UvU
- Reisser, Wesley and Reisser, Colin (2019). Chapter 3, "Coal" in *Energy Resources: From Science to Society*

October 23rd (Friday): Coal and Hazards 2

1. Air Pollution
2. Cardio-Vascular Diseases: Black Lung and Silicosis
3. Landslides and Coal Facilities: Aberfan (Wales, UK)
4. Coal Fires: Centralia (Pennsylvania)

Required Materials:

- Berkes, 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>

- British Pathe (1966). “This is Tragedy.” [Video]. Available on <https://www.youtube.com/watch?v=-Nr-6uxM7y8>
- Krajick, Kevin (2005). “Fire in the Hole.” *Smithsonian Magazine* (May). Available at <https://www.smithsonianmag.com/science-nature/fire-in-the-hole-77895126/>
- Reisser, Wesley and Reisser, Colin (2019). Chapter 3, “Coal” in *Energy Resources: From Science to Society*
- 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/>

Week 10:

October 27th (Tuesday): Petroleum and Hazards 1

1. Oil Geological Formation and Physical Qualities
2. Petroleum Landscape: from Extraction to Consumption
3. The Canadian Tar-Sand Oil
4. Hydraulic Fracturing (fracking)

Required Materials:

- Reisser, Wesley and Reisser, Colin (2019). Chapters 4, “Oil” in *Energy Resources: From Science to Society*
- University of Michigan Engineering (2012). “The Impact of fracking.” [Video]. Available on <https://www.youtube.com/watch?v=YAgI8qTtote>

Further Materials:

- Canadian Association of Petroleum Producers (2015). “What are the oil sands?” Available on <http://www.capp.ca/canadian-oil-and-natural-gas/oil-sands/what-are-oil-sands>

October 30th (Friday): Petroleum Hazards 2: Oil Spills

1. Oil Spills
2. Petroleum, Hazards, and Native American Communities:
 - a. Sadam Hussein’s Oil Fires
 - b. Keystone Pipeline
 - c. Quinhagak (Alaska)

Required Materials:

- “Persian Gulf War-Oil Fires” (2013) [video]. Available on https://www.youtube.com/watch?v=gyOMF4DXF_A
- Quinhagak’s Case: Oil Spill, Alaska’s Native community of Quinhagak, and Mushrooms. You can follow this event through The Greenbelt Society’s website. This group will implement a Live-Stream event of the oil spill remediation process.
Invited Speaker: Howard Sprouce
- 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>

Week 11:

November 3rd (Tuesday): Nuclear Energy and Hazards 1:

1. What is Nuclear Energy? Fission, Fusion, and Radioactivity
2. Nuclear Landscape
3. Nuclear Accidents: Chernobyl (1986) and Fukushima (2011)
4. Nuclear Waste Depository Sites: Yucca Mountain Nuclear Depository

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>

-8 News NOW Las Vegas (2019). “CBS takes rare tour of test tunnel under Yucca Mountain.” [Video]. Available on https://www.youtube.com/watch?v=H8_NwzRSOeU

Further Materials:

-US Energy Information Administration (2020). “Decommission Nuclear Reactors is Long-Term and Costly Process Available on <https://www.eia.gov/todayinenergy/detail.php?id=33792>

November 6th (Friday): Nuclear Energy and Hazards 2: Nuclear and Minorities

1. Nuclear Waste Depository Sites: Yucca Mountain Nuclear Depository (continued)
2. The Navajo Nation
3. Marshall Islands

Required Materials

-“Native Planet Program 5: United States-Surviving the Cold War and Uranium Mining.” Available on Hunter Kanopy

-Spanne, Autumn “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>

-Rust, Suzanne (2020). “U.S. says leaking nuclear waste dome is safe; Marshall Islands leaders don’t believe it.” The Angeles Times (July 1)

Week 11: Waste Disposal and the Geography of Garbage/*Basura*:

November 10th (Tuesday): Waste Disposal

1. Garbage: Landfills, Incineration, and Recycling
2. Non-Toxin Organic Liquid
3. Mining Acid Drainage
4. Hazardous Liquid Waste
5. Toxic Liquid Waste
6. The Freshkills Landfill Project/Park

Required Materials:

-Chapter 12: “Waste Disposal” in *Geohazards: Natural and Human* by Nicholas K. Coch (1995)

-The Freshkills Alliance (n.d.). “Freshkills Park.” Available at <http://freshkillspark.org/>

Further 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>

November 13th (Friday): Garbage, Hazards, and Human Communities

RESEARCH PAPER DUE

1. Landfills and Poor Communities
2. Ship Dismantling in Bangladesh
3. Plastic, Recycling and third world countries
4. E-Waste

Required Materials:

-Gwin, Peter (2014). The Ship-Breakers. *National Geographic* (May). Available on <https://www.nationalgeographic.com/magazine/2014/05/The-Ship-Breakers/>

-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/global-development/2018/oct/05/huge-rise-us-plastic-waste-shipments-to-poor-countries-china-ban-thailand-malaysia-vietnam>

-Milman, Olive (2019). "We're not a dump' – poor Alabama towns struggle under the stench of toxic landfills." *The Guardian* (April 15). Available on

-*NPR Radio* (Dec. 21, 2010) "After Dump, What Happens to Electronic Waste?" [with Audio]. Available on <http://www.npr.org/2010/12/21/132204954/after-dump-what-happens-to-electronic-waste>

Week 12: Dam Infrastructure, Hazards, and Marginalization

November 17th (Tuesday):

1. Dams, Types, and Construction
2. Dam Failures/Incidents

Cases:

- The Johnstown Flood, Pennsylvania (1889)
- The Vajont Dam, Italy (1963)
- The Oroville Dam, California (2017)

3. Current Status of Dams in United States

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>

-History Channel (2012). "The Johnstown Flood of 1889." [Video]. Available on <https://www.youtube.com/watch?v=Q62vlcFLLIM>

- OVO (n. d.). “The Vajont Disaster” [video]. Available at <http://www.ovovideo.com/en/vajontdisaster/>
- United States Society on Dams (2020). “Types of Dams.” Available at <https://www.usdams.org/dam-levee-education/overview/types-of-dams/>

Further Materials:

- 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>
- Vartabedian, Ralph (2018). “Human error played a role in Oroville Dam spillway failure, report finds.” *Los Angeles Times* (Jan. 5). Available at <https://www.youtube.com/watch?v=C0EgzJ0KGxg>

THE ELWHA CONFERENCE (I will inform you with the date/time)

November 20th (Friday): Environmental/Cultural Impacts and Dam Removals

1. Dams and Displacement of Human Communities
Case: The Aswan Dam (Egypt): Nubians Displacement and the Abu Simbel Impact
2. Dam Removals: The Elwha Dam Removal Project
Invited Speaker: Robert Lundahl

Required Materials:

- Olympic National Park (U.S. National Park Service) (2017). *Elwha River Restoration*. Available at <https://www.nps.gov/olym/learn/nature/elwha-ecosystem-restoration.htm>
- “Moving Temple of Ramses II (Egyptian Pharaoh)” (2010). [Video]. Available on <https://www.youtube.com/watch?v=HCDQikYVnCA>
- National Geographic (2014). “Hope for Egypt's Nubians in First-Ever Inclusion.” [Video]. Available on <https://www.youtube.com/watch?v=Wx59cTe6uSw>

Week 13:

November 24th (Tuesday): Our Civilization and its *Dangerous* Electric Dependency

1. Understanding the Electric Grid
2. Blackouts and Their Hazards

Required Materials:

- Hugh Byrd and Steve Matthewman (2004). “Exergy and the City: The Technology and Sociology of Power (Failure).” *Journal of Urban Technology*, Vol. 21, No. 3, 85–102, <http://dx.doi.org/10.1080/10630732.2014.940706>
- Massachusetts Institute of Technology (MIT) (2011). “The Future of the Electric Grid” (pages 2-7 and 247-253)

Further Materials:

- “How Does the Power Grid Work?” (Video). Available at <https://www.youtube.com/watch?v=IZz4sR5vfeo>

Part VIII: Understanding the Current Ecological Crisis

**November 25th (Wednesday): FRIDAY SCHEDULE
POSTER DUE**

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."

November 27th (Friday): NO CLASS. THANKSGIVING PERIOD:

Week 14:

December 1st (Tuesday): Some Consequences of Climate Change:

1. Sea Level Rise Impact
2. Ocean Heat waves ("Hot Blob")
3. Heat Waves
3. Salinization
4. Living Relics: Permafrost and Microorganisms

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>

-Lu, Denise and Flavelle, Christopher (2019). "Rising Seas Will Erase More Cities by 2050, New Research Shows." *The New York Times* (Oct. 29).

-Fountain, Henry (2019). "Europe's Heat Wave, Fueled by Climate Change, Moves to Greenland." *The New York Times* (August 2). Available at <https://www.nytimes.com/2019/08/02/climate/european-heatwave-climate-change.html>

-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>

-The Guardian (2020, Jan. 16). "Huge 'hot blob' in Pacific Ocean killed nearly a million seabirds." Available on <https://www.theguardian.com/environment/2020/jan/16/hot-blobocean-seabirds-killed-new-zealand-north-america>

Further Materials:

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

December 4th (Tuesday): Final Ecological Meditations

1. The Five Extinctions, and now the Sixth?
2. Learning from the past?: The Neo-Assyrian Empire Collapse

3. Bunkers, Seeds, and the Doomsday
4. Climate Change Refugees/Migrants
5. Final Ecological Meditations

Required Materials:

- Davis, Nicola (2019). "Climate change may be behind fall of ancient empire, say researchers." *The Guardian* (Nov. 13). Available on <https://www.theguardian.com/science/2019/nov/13/climate-change-maybe-behind-fall-of-ancient-empire-say-researchers>
- Duggan, Jennifer (n. d.). "Inside the Doomsday 'Vault.'"
- "Iceland holds funeral for first glacier lost to climate change." *The Guardian* (2018). Available on <https://www.theguardian.com/world/2019/aug/19/iceland-holds-funeral-for-firstglacier-lost-to-climate-change>
- Tarlach, Gemma (2018). "The Six Mass Extinctions that Have Swept Our Planet." *Discover Magazine* (July 18)
- Taylor, Matthew (2017). "Climate change 'will create world's biggest refugee crisis'." *The Guardian* (Nov. 20). Available on <https://www.theguardian.com/environment/2017/nov/02/climate-change-will-create-worlds-biggest-refugee-crisis>

Further Materials:

- Sagan, Carl (n. d.). "Carl Sagan's Pale Blue Dot Official" [video]. Available on <https://www.youtube.com/watch?v=GO5FwsblpT8>

Week 15:

December 8th (Tuesday): Presentations 1

December 11th (Friday): Reading Day

Week 16:

December 15th (Tuesday): Presentations 2

Appendix 1

Assignment Description

1. Proposal of the Research Paper (around 2 pages; for Graduate students ~3 pages):

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:

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

-MLA:

University of Southampton. "Substantial evidence of holographic universe." ScienceDaily. ScienceDaily, 30 January 2017. <www.sciencedaily.com/releases/2017/01/170130083231.htm>.

-APA:

!20

University of Southampton. (2017, January 30). Substantial evidence of holographic universe. ScienceDaily. Retrieved January 30, 2017 from www.sciencedaily.com/releases/2017/01/170130083231.htm

-Chicago:

University of Southampton. "Substantial evidence of holographic universe." ScienceDaily. www.sciencedaily.com/releases/2017/01/170130083231.htm (accessed January 30, 2017).

2. Final Research Paper (~8 pages; for Graduate students ~10 pages):

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 5 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.”

Citation styles

-MLA:

University of Southampton. "Substantial evidence of holographic universe." ScienceDaily. ScienceDaily, 30 January 2017. <www.sciencedaily.com/releases/2017/01/170130083231.htm>.

!21

-APA:

University of Southampton. (2017, January 30). Substantial evidence of holographic universe. ScienceDaily. Retrieved January 30, 2017 from www.sciencedaily.com/releases/2017/01/170130083231.htm

-Chicago:

University of Southampton. "Substantial evidence of holographic universe." ScienceDaily. www.sciencedaily.com/releases/2017/01/170130083231.htm (accessed January 30, 2017).

3. Discussion Board: Questions and Commentaries (Weekly)

- Every week I will post a few questions related to the week’s main topics (e. g. nuclear reactors).
- All of us will have to answer and discuss those questions on this Blackboard section.
- These questions **will substitute** the Mid-Term and Final Exams.
- Period to answer: from Saturday (12:00am) to Monday (12:00am) of every week
- Discussion Board Rubric Scale: from 0 to 4

<u>Level</u>	<u>Rubric</u>
Provocative	4
Sustantial	3
Standard	2
Weak	1
Incorrect	0

4. Oral Presentation of the Final Research Paper:

- Undergraduate students: 5 minutes and 5-10 minutes
- Graduate students: 5-10 minutes

5. Elaboration of a Poster: You will elaborate a poster in order to present your Final Research. This type of posters are very typical in conferences such as the American Association of Geographers. This poster works like the structure of a research paper; that is, you need to show the Background (Introduction), Research Objective, Argument, Methods, Evidence. Although you can use texts, the main mechanism is visual.

6. Abstract (for Graduates):

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

Sample of an Abstract:

Abstract AAG, Denver, 2020

“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 just this past spring, 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