

# International Pollution Issues

Spring 2021

Tuesdays/Fridays, 11:10 AM to 12:25 PM – HN 1022

Undergraduate GEOG 33500-01

Graduate GEOG 71500-01

**Instructor:** Enrique Lanz Oca  
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**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:

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

## Modus Operandi for the Class:

### Type of Class: Virtual Class

-The class will be **synchronous** (via Zoom). If there is a technical problem with Zoom, I will send you another invitation or another digital platform to initiate the communication.

**-It is a requirement to attend to the class.** If you cannot attend due to an extreme difference in Time Zone (e. g. in countries such as China, South Korea, Taiwan, Indonesia, Australia or New Zealand or other type of reason (e. g. technical), please let me know it as soon as possible.

**-The class will be recorded.** If there are technical problems, I will not able to send you the copy.

-Protocol of Zoom communication Class: Although not a total requirement, the camera should be “**ON**” during the class (please, tell me if there is any issue with the camera ON)

**-Zoom Join Code Information:**

a. Friday, January 29:

<https://pratt.zoom.us/j/96651574905?pwd=aU83MWdHTVJnYjRsWnZxL1NCcnAzdz09>

b. Tuesday, Feb. 2

<https://pratt.zoom.us/j/94656844150?pwd=V1dxdDI3Qnd4T0xXRzNqOUhsL2w3QT09>

c. Friday, Feb. 5

<https://pratt.zoom.us/j/97958762807?pwd=c2FDUENnalJNd254SEhDTFJDQTRHQT09>

d. Tuesday, Feb. 9

<https://pratt.zoom.us/j/99254366510?pwd=MTJqSFkwcnBLVlkvR3h5TldQWDD1dz09>

e. Friday, Feb. 12

<https://pratt.zoom.us/j/96038665052?pwd=K1R1WIZkR1RxcWtROTR1WVFqKzFwQT09>

f. Tuesday, Feb. 16

<https://pratt.zoom.us/j/92516381416?pwd=WEdGeUN3VGxyN2VBZXYwUGlnTURxUT09>

g. Friday, Feb. 19

<https://pratt.zoom.us/j/96099723878?pwd=MnR3MXpwSzRwV3dtOXkxaFVN Rz c1QT09>

h. Tuesday, Feb. 23

<https://pratt.zoom.us/j/92543538918?pwd=TGZucFFtOWI5S3VkOGluM3pPYitvdz09>

i. Friday, Feb. 26

<https://pratt.zoom.us/j/98918714686?pwd=MEVZSmk0d0NaWmVha3Y3a3BSY2MxQT09>

j. Tuesday, March 2

<https://pratt.zoom.us/j/93598723780?pwd=VGt3M0k2L0o2UE9KRHNUN0VSYzMzUT09>

k. Friday, March 5

<https://pratt.zoom.us/j/91465614847?pwd=djRuZ2VOY3BCaUVzQWNBR0Q1MGZhUT09>

I will send you the rest of Zoom Join Codes every week (check your email).

**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:**

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

### **Student Learning Outcomes:**

<b>Upon completion of this course, students will be able to...</b>
1. Have a basic understanding of how Earth works as a planetary structure.
2. Comprehend the most prevalent environmental impacts caused by our civilization and think about those possible measures capable of promoting a more sustainable society environmentally speaking.
3. Your attainment of these learning outcomes will be assessed especially through your writing assignments, exams, scientific/artistic projects (e. g. Poster), and class participation.

**Course Assignments.** This course will be based upon:

**Undergraduate and Graduate**

<u>ASSIGNMENTS</u>	<u>% for the Final Grade</u>	<u>CHARACTERISTICS/ REQUIREMENTS</u>
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
POSTER	10% 5 %	
PRESENTATIONS	5% 5%	~ 5 minutes (e. g. using PowerPoint) ~ 10 minutes (e. g. using PowerPoint)
PARTICIPATION	5% 5%	
Discussion Board Event	5% and 5%	Discussion of an international pollution event (e. g. Keystone XL Pipeline).
Meetings outside the class		-Not required -Required at least ONCE

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

Key points about these assignments:

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

## **Course Contents and Calendar:**

### **Part I: Course Introduction**

#### **Week 1:**

#### **January 29<sup>th</sup> (Friday): Introduction, Science/Traditional Knowledge, and Pollution**

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

#### **Required Materials:**

- Bradford, Alina (2015). "Science & the Scientific Method: A Definition." *Livescience* (March 30). Available at <http://www.livescience.com/20896-science-scientific-method.html>
- Environmental Encyclopedia (2003). "Transboundary Pollution." Available at <https://www.encyclopedia.com/environment/encyclopedias-almanacs-transcripts-and-maps/transboundary-pollution>
- European Environmental Agency (2018). "Pollution." Available at <https://www.eea.europa.eu/archived/archived-content-water-topic/wise-help-centre/glossary-definitions/pollution>
- Nicholas, George (2018). "It's taken thousands of years, but Western science is finally catching up to Traditional Knowledge." *The Conversation* (February 14). Available on <https://theconversation.com/its-taken-thousands-of-years-but-western-science-is-finally-catching-up-to-traditional-knowledge-90291>
- Milman, Oliver (2018). "Robert Bullard: 'Environmental Justice isn't just slang, it's real.'" *The Guardian* (December 20). Available on <https://www.theguardian.com/commentisfree/2018/dec/20/robert-bullard-interview-environmental-justice-civil-rights-movement>

### **PART II: Atmosphere and Pollution**

#### **Week 2: Earth's Atmosphere:**

#### **February 2<sup>nd</sup> (Tuesday):**

1. Structure and Composition
2. Solar Energy and the Earth
3. Atmospheric Pressure Systems
4. Air Masses and the Atmospheric Circulation

#### **Required Materials:**

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

#### **February 5<sup>th</sup> (Friday): Atmospheric Pollution 1**

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

### Required Materials:

- Dahlman, Carl T. and Renwick, William H. (2014). Chapter 5, “Earth’s Resources and Environmental Protection” (read pages 187-191) in *Introduction to Geography*
- Met Office (2018). “The Great Smog of 1952.” Available at <https://www.metoffice.gov.uk/learning/learn-about-the-weather/weather-phenomena/case-studies/great-smog>
- The New York Times* (2018). “In a High-Stakes Environmental Whodunit, Many Clues Point to China.” Available at <https://www.nytimes.com/2018/06/24/world/asia/china-ozone-cfc.html>
- Schlanger, Zoe (2017). “The Story of the 27 Sudden Deaths in 1948 is a Bleak Reminder of Why America Needs Clear Air Laws.” *Quartz* (Nov. 1<sup>st</sup>). Available at <https://qz.com/1117029/the-sudden-death-of-26-people-in-a-tiny-american-town-on-halloween-weekend-shows-the-bleak-reality-of-life-before-clean-air-laws/>
- Union of Concerned Scientists (n. d.). “Is There a Connection Between the Ozone Hole and Global Warming?” Available at [https://www.ucsusa.org/global-warming/science-and-impacts/science/ozone-hole-and-gw-faq.html#.W0PK\\_K2ZOGQ](https://www.ucsusa.org/global-warming/science-and-impacts/science/ozone-hole-and-gw-faq.html#.W0PK_K2ZOGQ)

### **Week 3: Atmosphere and Pollution 2:**

#### **February 9<sup>th</sup> (Tuesday):**

1. Wildfires
2. Volcanic Eruptions
3. Aerosols
4. Thinking about the Proposal of the Final Research Paper
5. Organizing Discussion Board Event: 1st Trial (Making the Groups)

### Required Materials:

- Casazza, Marco; Lega, Massimo; Liu, Gengyuan; Ulgiati, Sergio; and Endreny, Theodore (2018). “Aerosol pollution, including eroded soils, intensifies cloud growth, precipitation, and soil erosion: A review.” *Journal of Cleaner Production*, Volume 189, 10 July 2018, Pages 135-144.
- Chapter 16, “Wild Fires” pages 488-492)
- Gislason, S. R. et al. (2015). “Environmental Pressure from the 2014-15 Eruption of Barbanbunga Volcano, Iceland.” *Geochemical Perspective Letters*. Available at [http://www.geochemicalperspectivesletters.org/documents/GPL1509\\_noSI.pdf](http://www.geochemicalperspectivesletters.org/documents/GPL1509_noSI.pdf)
- Hirschlag, Allison (2020). “The Long Distance Harm done by Wildfires” (*BBC*, 23rd August). Available at <https://www.bbc.com/future/article/20200821-how-wildfire-pollution-may-be-harming-your-health>

#### **February 12<sup>th</sup> (Friday): NO CLASS**

### **PART III: Hydrosphere and Pollution**

#### **Week 4:**

#### **February 16<sup>th</sup> (Tuesday): The Hydrosphere:**

1. The Water or Hydrological Cycle

2. Planetary Water Distribution
3. Surface Waters: Oceans, Rivers, Lakes, and Ice
4. Underground Water (aquifers)

Required Materials:

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

**February 19<sup>th</sup> (Friday): Oceans and Pollution 1:**

1. Plastics, Microplastics, and the Ocean
2. Sargassum and Algae Invasion
3. The Law of the Sea (UNCLOS) and International Dumping

Required Materials:

-Browne, Mark Anthony, Crump, Phillip, Niven, Stewart, Teuten, Emma, Tonkin, Andrew, Galloway, Tamara, and Thompson, Richard (2011). “Accumulation of Microplastic on Shorelines Worldwide: Sources and Sinks.” *Environmental Science & Technology* DOI: 10.1021/es201811s

-Hu, Chuanmin, Brock Murch, Brian B. Barnes, Mengqiu Wang, Jean-Philippe Maréchal, James Franks, Donald Johnson, Brian Lapointe, Deborah S. Goodwin, Jeffrey M. Schell, and Amy N. S. Siuda (2016). “Sargassum watch warns of incoming seaweed.” *Earth and Space Science news (Eos)* (Sept. 6)

-United Nations (n. d.). “Oceans and the Law of the Ocean.” Available at <https://www.un.org/en/sections/issues-depth/oceans-and-law-sea/>

Further Materials:

-Napper, Imogen E. and Richard C. Thompson (2016). “Release of Synthetic Microplastic Fibres from Domestic Washing Machines: Effects of Fabric Type and Washing Conditions.” *Marine Pollution Bulletin* 112, no. 1-2 (September 14)

**Week 5:**

**February 23<sup>rd</sup> (Friday): Oceans and Pollution 2:**

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

-Case: Quinhagak (Alaska): Oil Spill, Alaska’s Native community of Quinhagak, and Mushrooms. **Invited Speaker: Howard Sprouse**. You can find his podcast posted on The Greenbelt Society’s website. Available at <https://greenbeltsociety.wordpress.com/2020/10/17/recent-podcasts/>

Required Materials:

-Kaushik, Mohit (2018). “Major Oil Spills of the Maritime World.” *Marine Environment* (March 26). Available at <https://www.marineinsight.com/author/mohit/>

-National Geographic (2016). “In the Arctic’s Cold Rush, There Are No Easy Profits.” Available at <https://www.nationalgeographic.com/magazine/2016/03/new-arctic-thawing-rapidlycircle-work-oil/>

-Reuters (2018). “Oil Spilled at Sea.” Available at <http://fingfx.thomsonreuters.com/gfx/rngs/OIL-SPILLS/010060SL1GQ/index.html>

Further Materials:

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

### **February 26<sup>th</sup> (Friday): Oceans and Pollution 3:**

#### **-RESEARCH PAPER PROPOSAL DUE**

1. Submarine Mining
2. Acidification
3. Coral Bleaching

#### Required Materials:

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

### **Week 6:**

#### **March 2<sup>nd</sup> (Tuesday): Rivers and Lakes Pollution**

1. Transboundary Watersheds
2. Convention on the Law of the Non-Navigational Uses of International Watercourses (1997)
3. Water Transfers

#### Required Materials:

- Kaiman, Jonathan (2014). "China's Water Diversion Project starts to flow to Beijing." *The Guardian* (Dec. 12). Available at <https://www.theguardian.com/world/2014/dec/12/china-water-diversion-project-beijing-displaced-farmers>
- United Nations (1997). "Convention on the Law of the Non-Navigational Uses of International Watercourses. UN International Law Commission. Available at [http://legal.un.org/ilc/texts/instruments/english/conventions/8\\_3\\_1997.pdf](http://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf)
- U.S. EPA (2015). "What is a Watershed?" Available at <http://water.epa.gov/type/watersheds/whatis.cfm>
- Water-technology.wet (2015). "GMR (Great Man-Made River) Water Supply Project, Libya." Available at <http://www.water-technology.net/projects/gmr/>

### **March 5<sup>th</sup> (Friday):**

1. Transboundary Conflicts
2. Transboundary River Pollution  
Cases: a. The Colorado River



b. The Tijuana River

3. The Aral Sea Disaster

Required Materials:

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

**Part IV: Energy Sources and Pollution**

**Week 7:**

**March 9<sup>th</sup> (Tuesday): Nuclear Energy and Pollution**

1. What is Nuclear Energy?
2. Fission and Fusion
3. Nuclear landscape: uranium mining/enriching, reactor, and deposit

Required Materials

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

**March 12<sup>th</sup> (Friday): Nuclear Pollution**

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

Required Materials:

- Calmet, Dominique P. (1989). "Ocean Disposal of radioactive Waste: Status Report." Available at <https://www.iaea.org/sites/default/files/31404684750.pdf>
- Lallanilla, March (2013). "Chernobyl: Facts About the Nuclear Disaster." *Livescience* (Sept. 25). Available at <http://www.livescience.com/39961-chernobyl.html>
- Reisser, Wesley and Reisser, Colin (2019). Chapter 6, "Nuclear Power" in *Energy Resources: From Science to Society*
- U.S. Department of Energy (2016). "Waste Isolation Pilot Plant Overview." [Video]. Available at <https://www.youtube.com/watch?v=kZYQIXd1lkk>

**Week 8:**

**March 16<sup>th</sup> (Tuesday): Coal and Pollution 1**

1. Geological Formation

2. Types of Coal
3. Mining, Transportation, Production, and Consumption

Required materials:

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

**March 19<sup>th</sup> (Friday): Coal and Pollution 2**

1. Coal and Pollution
2. Coal and the Trans-border Pollution
3. Coal Mining Fire and Pollution: Centralia (US)

Required Materials:

-Berks, Howard (2018). An Epidemic Is Killing Thousands Of Coal Miners. Regulators Could Have Stopped It.” *NPR* (December 18) (also audio). Available at <https://www.npr.org/2018/12/18/675253856/an-epidemic-is-killing-thousands-of-coal-miners-regulators-could-have-stopped-it>

-Krajick, Kevin (2005). “Fire in the Hole.” *Smithsonian Magazine* (May). Available at <https://www.smithsonianmag.com/science-nature/fire-in-the-hole-77895126/>

-*Scientific American* (2017, Jun. 7). “The Other Reason to Shift away from Coal: Air Pollution That Kills Thousands Every Year.” Available at <https://www.scientificamerican.com/article/the-other-reason-to-shift-away-from-coal-air-pollution-that-kills-thousands-every-year/>

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

Week 9:

**March 23<sup>rd</sup> (Tuesday): MID-TERM Exam**

**March 26<sup>th</sup> (Friday):**

1. **Checking the progress of the Final Research Paper**
2. **Organizing Discussion Board Event: 2nd Trial (Making the Groups)**

Week 10:

**March 30<sup>th</sup> (Tuesday): NO CLASS; SPRING BREAK**

**April 2<sup>nd</sup> (Friday): NO CLASS; SPRING BREAK**

Week 11:

**April 6<sup>th</sup> (Tuesday): Petroleum and Pollution 1:**

1. Geological Formation
2. The Petroleum Landscape

3. The Canadian Oil-Tar Sand
4. Hydraulic Fracturing (Fracking)
5. Trans-Border Oil Transportation: pipelines and trains

Required Materials:

- Al-Jazeera (n.d.). “To the Last Drop: Canada’s Dirty Oil Sands.” Available online at <https://www.aljazeera.com/programmes/witness/2011/06/20116227153978324.html>
- Brown, Matthew (2018). “US miscalculated benefits of oil train brakes” AP (December 20). Available at <https://www.apnews.com/2e91c7211b4947de8837ebda53080b9>
- Reisser, Wesley and Reisser, Colin (2019). Chapters 4, “Oil” in *Energy Resources: From Science to Society*
- Smith, Mitch and Bosman, Julie (2017). “Keystone Pipeline leaks 210,000 gallons of oil in South Dakota.” *The New York Times* (Nov. 16). Available at <https://www.nytimes.com/2017/11/16/us/keystone-pipeline-leaks-south-dakota.html>

Further Materials:

- Canadian Association of Petroleum Producers (2015). “What are the oil sands?” Available at <http://www.capp.ca/canadian-oil-and-natural-gas/oil-sands/what-are-oil-sands>
- U.S. Environmental Protection Agency (EPA) (2015). “Assessments of the Potential Impacts of the Hydraulic Fracturing for Oil and Gas on Drinking Water Resources. Executive Summary (June). Available on EPA: “Fracking has no broad impact on drinking water” (US Today June 2015) at <http://www.usatoday.com/story/news/2015/06/04/fracking-epa-drinking-water/28510779/>

**April 9<sup>th</sup> (Friday): Biosphere, Planetary Cycles and Ecosystems**

1. What is the Biosphere?
2. Planetary Biochemical Cycles:
  - a. Flow of Energy and Matter
  - b. Water, Carbon, Oxygen, and Nitrogen
3. Ecosystems and Biomes

Required Materials:

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

**Week 12:**

**April 13<sup>th</sup> (Tuesday): Ecosystems, Genetics, Invasive Species, and Pandemics**

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

Required Materials:

- DiBacco, Claudio et al. (2012). “Ballast water transport of non-indigenous zooplankton to Canadian ports.” *ICES Journal of Marine Science*, 69(3), 483-491. doi:10.1093/icesjms/fsr133
- Gallegos, Jenna (2017). “GMO salmon caught in U.S. regulatory net, but Canadians have eaten 5 tons.” *The Washington Post* (August 4). Available at <https://www.washingtonpost.com/>

news/speaking-of-science/wp/2017/08/04/gmo-salmon-caught-in-u-s-regulatory-net-butcanadians-have-eaten-5-tons/?utm\_term=.1695ac7c0ebc

-Lallanilla, Marc (2019). "What Are GMOs and GM Foods?" Live Science. Available at <https://www.livescience.com/40895-gmo-facts.html>

-LePan, Nicholas (2020). "Visualizing the History of Pandemics."

Available at <https://www.visualcapitalist.com/history-of-pandemics-deadliest/>

-The National Wildlife Federation (2019). "Invasive Species." Available at <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Threats-toWildlife/Invasive-Species>

#### Further Materials:

-*Democracy Now* (2010, Sept. 17). "Percy Schmeiser vs Monsanto: The Story of a Canadian Farmer's Fight to Defend the Rights of Farmers and the Future of Seeds." Available at [https://www.democracynow.org/2010/9/17/percy\\_schmeiser\\_vs\\_monsanto\\_the\\_story](https://www.democracynow.org/2010/9/17/percy_schmeiser_vs_monsanto_the_story)

#### **April 16<sup>th</sup> (Friday):**

1. Airplane Traffic

2. Shipping Transportation

3. Organizing Discussion Board Event: 3rd Trial (Making the Groups)

**4. FINAL RESEARCH PAPER DUE**

#### Required Materials:

-Clear Seas (2018). "Air Pollution and Marine Shipping." Available at <https://clearseas.org/en/air-pollution/>

-IATA (2013). "Airlines Expect 31% Rise in Passenger Demand by 2017." Available at <http://www.iata.org/pressroom/pr/pages/2013-12-10-01.aspx>

-International Maritimer Organization (IMO) (2020). "Prevention of Air Pollution from Ships." Available at <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air-Pollution.aspx>

-Inman, Mason (2010). "Plane Exhaust Kills More People Than Plane Crashes." *National Geographic* (October 10). Available at <http://news.nationalgeographic.com/news/2010/10/101005-planes-pollution-deaths-science-environment/>

-Mann, Adam (2010). "Space tourism to accelerate climate change." *Nature* (October 22) Available at <http://www.nature.com/news/2010/101022/full/news.2010.558.html>

-Vidal, John (2009). "Health risks of shipping pollution have been 'underestimated'." *The Guardian* (Thursday 9 April). Available at <http://www.theguardian.com/environment/2009/apr/09/shipping-pollution>

#### **Week 13: Garbage and Pollution and Earth's Day Week Celebration**

#### **April 20<sup>th</sup> (Tuesday):**

1. What is Garbage?

2. Treatment Methods: Landfills, Incineration, and Recycling

3. The Freshkills Landfill Project/Park

#### Required Materials:

-Burford, Melanie and Moyer, Greg (2014). "Living City | Where Does Our Trash Go?" *The New York Times* (Sep. 25<sup>th</sup>, 2014) (Video). Available at <http://www.nytimes.com/video/>

nyregion/100000003131953/where-does-our-trash-go.html

- Chapter 12: “Waste Disposal” in Geohazards: Natural and Human by Nicholas K. Coch
- The Freshkills Alliance (n.d.). “Freshkills Park.” Available at <http://freshkillspark.org/>

**April 22 (Thursday): The Earth’s Day: Mini-Conference (via Zoom)**

**April 23<sup>rd</sup> (Friday): DISCUSSION BOARD EVENT**  
**Case: the Keystone XL Pipeline Project (See Appendix 1)**

**Week 14:**

**April 27<sup>th</sup> (Tuesday): Trans-Border Garbage**

1. Trans-Border Garbage
2. The Basel Convention (1989)
3. Ship Breakers: Bangladesh
4. Importing Trash and Electricity: Sweden

**Required Materials:**

- Clark, Liat (2012). “Sweden to import 800,000 tonnes of trash to burn for energy.” Available at <http://www.wired.co.uk/article/sweden-imports-garbage-for-energy>
- Gwin, Peter (2014). The Ship-Breakers. *National Geographic* (May). Available at <https://www.nationalgeographic.com/magazine/2014/05/The-Ship-Breakers/>
- 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>
- United Nations (2020). “Basel Convention: Overview.” Available at <http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx#>

**April 30<sup>th</sup> (Friday):**

1. Plastic, Recycling and third world countries
2. E-Waste
3. Cloud garbage: Virus, Spams, and Trojans
4. Space: satellite junk and the Nemo Point’s garbage

**Required Materials:**

- Greenpeace (2009). “Where does e-waste end up?” Available at <http://www.greenpeace.org/international/en/campaigns/detox/electronics/the-e-waste-problem/where-does-e-waste-end-up/>
- McVeigh, Karen (2018). “Huge rise in US plastic waste shipments to poor countries following China ban.” *The Guardian* (Oct. 5). Available at <https://www.theguardian.com/globaldevelopment/2018/oct/05/huge-rise-us-plastic-waste-shipments-to-poor-countries-chinaban-thailand-malaysia-vietnam>
- Moser, Dave (2017). “A Spacecraft Graveyard Exists in the Middle of the Ocean-here’s

what's down there." *Business Insider* (Oct. 22). Available at <https://www.businessinsider.com/spacecraft-cemetery-point-nemo-googlemaps-2017-10>  
-*Scientific American* (2001, Oct. 19). "When did the term 'computer virus' arise?" Available at <https://www.scientificamerican.com/article/when-did-the-term-compute/>

Further Materials:

-NASA (2013). "Space Debris and Human Spacecraft." Available online at

[http://www.nasa.gov/mission\\_pages/station/news/orbital\\_debris.html](http://www.nasa.gov/mission_pages/station/news/orbital_debris.html)

**Part VII: Understanding the Current Ecological Crisis**

**Week 15**

**May 4 (Tuesday): Climate Change: Facing the Unknown**

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

**4. POSTER DUE**

Required Materials:

-Chapter 11: "Climate Change."

**May 7 (Friday): Some Consequences of Climate Change:**

1. Sea Level Rise Impact in:
  - a. Coastal landfills
  - b. Nuclear residual sites
  - c. Salinization
2. Ocean Heat waves ("Hot Blob"): **Guest Speaker: Natalie Monterrosa**
3. Living Relics: Permafrost and Microorganisms

Required Materials:

- Brand, James et al. (2017). "Potential pollution risks of historic landfills on low-lying coasts and estuaries." Available at <https://onlinelibrary.wiley.com/doi/full/10.1002/wat2.1264>
- Chen, Joyce and Mueller, Valerie (2018). "Climate change is making soils saltier, forcing many farmers to find new livelihoods." *The Conversation* (November 29). Available at <http://theconversation.com/climate-change-is-making-soils-saltier-forcing-many-farmersto-find-new-livelihoods-106048>
- Edwards, Rob (2005). "Rising sea levels may destroy nuclear dump." *New Scientist* (June 28). Available at <https://www.newscientist.com/article/dn7591-rising-sea-levels-may-destroynuclear-dump/>
- Leman, Jennifer (2020). "Welp, Scientists Found 28 New Virus Groups in a Melting Glacier." *Popular Mechanics* (Jan. 23). Available at <https://www.popularmechanics.com/science/health/a30643717/viruses-found-melting-glacier/>
- NPR (2018, Jan. 24). "Are There Zombie Viruses In The Thawing Permafrost?" Available at <https://www.npr.org/sections/goatsandsoda/2018/01/24/575974220/are-there-zombieviruses-in-the-thawing-permafrost>

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

### **Week 16**

#### **May 11 (Tuesday): Final Ecological Meditations about the Current Ecological Crisis**

1. The Five Extinctions, and now the Sixth?
2. Bunkers, Seeds, and the Doomsday
3. Climate Change Refugees/Migrants
4. Final Ecological Meditations: From Trump's to Biden's Administration and Beyond

#### **Required Materials:**

- Davenport, Coral and Friedman, Lisa (2021). "Biden Cancels Key Stone XL Pipeline and Rejoins Paris Climate Agreement." *The New York Times* (Jan. 21). Available at <https://www.nytimes.com/2021/01/20/climate/biden-paris-climate-agreement.html>
- 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>
- Popovich, Nadja, Albert-Ripka, Livia, and Pierre-Louis, Kendra (2021)"The Trump Administration Rolled Back More Than 100 Environmental Rules. Here's the Full List." *The New York Times* (Jan. 21). Available at <https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks-list.html>
- 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>

#### **May 14 (Friday)**

#### **-PRESENTATIONS 1**

### **Week 16:**

#### **May 18<sup>th</sup> (Tuesday): NO CLASS; Reading Day**

#### **Possibilities to have the second Round of PRESENTATIONS 2**

### **Week 17**

#### **May 24<sup>th</sup> (Friday):**

#### **-FINAL EXAM**

#### **-PRESENTATIONS 3**

## **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 2<sup>nd</sup> 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](mailto:jtrose@hunter.cuny.edu) or 212-650-3262) or Colleen Barry ([colleen.barry@hunter.cuny.edu](mailto: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

### 1. Proposal of the Research Paper:

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

#### Structure of the Proposal:

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

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

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

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

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

- a. Primary sources: information obtained directly by the student: experiments, interviews, direct observation, etc.

b. Secondary sources: articles, books, websites, films, or audios.

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

6. Conclusion: Summary of the paper proposal.

7. Bibliography, Works Cited, or References section

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

## **2. Final Research Paper:**

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

### Structure of a Research Paper

#### -Introduction

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

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

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

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

An example of a research question and argument could be:

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

Other alternative structure could be,

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

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

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

### **3. Abstract (for Graduates):**

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

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

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

**A Sample of an Abstract for the American Association of Geographers Conference (AAG):**  
“Climate Change Denial and the Tragedy of North America's Dams”

With approximately 90,000 big dams, the United States has more dams than nearly any other country. It is commonly recognized that these dams, largely built between the 1930s and the 1960s, are in a state of disrepair; in fact, 80 percent of U.S. dams will reach their life span by 2020. This condition is exasperated by unprecedented changes in climatic patterns. Climate change is accelerating dam vulnerability and boosting the risk of collapse. In California, the Oroville dam, the tallest dam in the United States, nearly collapsed due to the unusual amount of winter precipitation in 2017. In Puerto Rico, the Guajataca Dam, hit hard by hurricane Maria, also nearly collapsed in 2018. And in March 14, 2019, the Spencer Dam did collapse, making it the first dam ever to be destroyed by ice chunks. Despite the undeniable influence of the weather,

some entities still reject climate change as a factor threatening dam infrastructure, asserting that the managerial negligence of public institutions and the aging status of dams are the only causes of this decay. This paper exposes how two main ideologies have contributed to the current rejection of climate as a factor in dams' vulnerability. First, the engineering profession still produces engineers who are taught to observe nature mechanically, without recognizing the changing ecological scenario. Second, some conservative agencies, in an effort to convince the public that public institutions and infrastructures do not and cannot function, erase climatic influence from their descriptions.

**Keywords:** Dams, climate change, engineering, and conservatism

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

#### **4. Two Exams: Mid-Term and Final Exams:**

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

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

Sample of a Multiple-Choice question:

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

**5. 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. Oral Presentation of the Final Research Paper:**

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. Class Participation:**

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

### **8. Discussion Board Event (Group Project):**

1. Focus: We will discuss **the KeystoneXL Pipeline** case.
2. The students will be divided in various groups that would represent some of the main public and private agencies and individuals involved in the process. For example,
  - TransCanada Energy: the owner of the pipeline
  - US Federal Government (Trump's and Biden's administration)
  - Canadian Government
  - State and Province governments (Canada and US)
  - Oil companies extracting oil tar sand (province of Alberta)
  - Native American and First Nations communities
  - Environmental groups
  - Local communities
  - Banks connected to the companies
  - Workers participating in this project
  - Unions
3. The students would prepare the defense of these groups studying some reports and documents focused on each of these agencies.
4. Modus Operandi: **It would take place on Friday, April 23 (via Zoom) and would be broadcast through the Greenbelt Society link to anyone.** This event will be connected to the celebration of the Earth's Day on Thursday, April 22.