

International Pollution Issues

Spring 2020

Modified Syllabus from Week 8 to the End of the Semester

Undergraduate GEOG 33500-01
Graduate GEOG 71500-01

Instructor: Enrique Lanz Oca
Office: HN1032
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Virtual Office Hours: **Tuesdays 11:15am-12:15pm** by email or Video-Conference (e.g. Zoom); however, you can e-mail the instructor whenever you wish. You may also make an appointment to talk with the instructor through a virtual platform (mainly Zoom and other digital platform).

SPECIAL INSTRUCTIONS:

A. Modus Operandi for the Class:

1. We will largely use “**Discussion Board**” (**Blackboard**) as a way to communicate. I will post some questions after Fridays’ and Tuesdays’ classes related to the Class’s topic/s (e.g. smog). All of us will have to answer and discuss those questions on this Blackboard section. This method will be the main component of our class.

2. We will have also a Video-Conference class using a digital platform (**mainly Zoom**). It is NOT a requirement to participate in this virtual class, but JUST a COMPLEMENT of the Discussion Board.

Dates and hours (Video-Conference class): **Tuesdays and Fridays 10:00 – 11:00am** (via Zoom).

Video-Conference Class (digital platform): Zoom. You will receive an e-mail showing you a Zoom Code. Just click in the link and you can access to the meeting

-Join meeting Codes:

-Friday, March 20th (Coal and Pollution):

<https://us04web.zoom.us/j/587119044>

-Tuesday, March 24th (Oil and Pollution):

<https://us04web.zoom.us/j/360306231>

-Friday, March 27th (Ecosystems, Invasive Species, Pollution):

<https://us04web.zoom.us/j/630418076>

I will be sending you the following Codes every week: check in Announcements (Blackboard)

B. Class Materials:

1. The materials (e.g. chapters, articles) are already posted either on Blackboard or online (check the syllabus).
2. **PowerPoint Presentations:** You will find the PowerPoint Presentations for the class in the week folders posted on the Blackboard section “Course Materials.”

C. Other Assignments:

1. **Paper Proposal Commentaries:** I will send you my **commentaries of your Paper Proposal** in the next couple of days by email. If you wish, you can re-do the proposal based upon my commentaries. You will send the new proposal by email.
2. **Mid-Term and Final Exams:** We have decided that we will **NOT have Mid-Term and Final Exams.** This exercise will be substituted by our Discussion Board answers and Discussion.
3. **Final Research Paper:** **You will send the Research Paper by email or Blackboard.**

Check in the syllabus for the deadlines.

4. **Presentations of the Final Research Paper (Zoom):** **EXTRA-CREDIT (5%)**

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 West Nile Virus reaching the United States to Chinese mercury found in the Olympic-Mountain lakes through stagnant plastics in the Pacific Ocean, any pollutant and contaminant can reach any point in a planetary scale. We examine therefore the main international trans-boundary pollution sources with especial emphasis in the main industrial and urban centers, transport pathways such as oil/gas pipelines, maritime-shipping and aerial routes, and contamination events such as oil spills or nuclear-power plant accidents that impact beyond a country's borders. Finally, this course will discuss the current national and international legal instruments of cooperation such as the London Treaty about ocean dump or possible future international treaties such as a definite international Climate Change Pact to counteract degradation of the environment.

Course Objectives:

1. This course is designed to introduce students to global implications of anthropogenic activities that lead to production of critical substances resulting in detrimental changes to our environment.
2. Students will 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. Students will be guided in forming an independent study on environmental concerns at the international level to enhance students' perception of the important role of man's responsibility towards a sustainable future.

Expected Learning Outcomes:

A. Course-Specific Learning Outcomes:

Students taking this course will be able to...

1. Think critically about the complexities of the planet Earth, especially the intersections between physical and human phenomena.
2. Analyze the planet as a complex structure and be able to comprehend the ways in which students' immediate environments are connected to both the local and distant ecologies.
3. Examine preconceived notions about boundaries of all sorts, including social, political, and geographical ones. Consider the social construction of divisions between humans and non-humans.

These processes will be assessed through their participation in class discussion, essays, and Blackboard responses.

B. General Education Learning Outcomes:

1. Communication Skills Students will be able to write, read, listen and speak critically and effectively. Students' ability to speak and listen effectively will be assessed through their participation in class discussions. Their ability to read critically will be assessed by their comments on course readings. Writing skills will be assessed through essays as well as regular responses on Blackboard covering lectures, readings, and class discussions.
2. Scientific Reasoning and Social and Behavioral Sciences- Students will be able to apply the concepts and methods of the natural and social sciences. Students' ability to apply concepts and methods of sciences will be measured via class discussions, essays, and responses on Blackboard.

3. Information & Technology Literacy- Students will be able to collect, evaluate and interpret information and effectively use information technologies.
4. Values- Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.

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.

Assignments:

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

Undergraduate Students

1. Final research paper
 - a. Around 8 pages (~2,000 words)
 - b. at least 5 references
2. Research paper proposal (~2 pages)
3. Mid-Term exam: **NO**
5. Final exam: **NO**
(Substituted by Discussion Board)
6. Presentation of the Research Paper (around 5 minutes)

Graduate Students

1. Final research paper
 - a. Around 10 pages
 - b. at least 10 references
2. Research paper proposal (~3 pages)
3. Abstract of the research paper:
Extra-credit (250 words plus keywords)
4. Mid-Term exam: **NO**
5. Final exam: **NO**
(Substituted by Discussion Board)
6. Presentation of the Research Paper (around 10 minutes)

Evaluation:

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

	Percentage of Final Grade
Research paper proposal	20%
Final Research Paper	45%
Mid-term exam and Final exam (Discussion Board)	35%
Presentation of the Research Paper	(extra-credit; 5%)

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

	Percentage of Final Grade
Research paper proposal	20%
Final Research Paper	45%
Mid-term exam and Final exam (Discussion Board)	35%
Abstract of the research paper	(extra-credit 5%)

Presentation of the Research Paper

(extra-credit; 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/>.

These assignments are described in detail in “Assignments Description” located in the end of the Syllabus, Appendix 1.

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

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.

SUBSTANTIALLY CHANGES HAVE BEEN INCLUDED

Course Contents and Calendar:

Week 1:

January 28th (Tuesday): Introduction

1. Introduction to the course and description of the syllabus
2. Science and the Scientific Method
3. What is Pollution?
4. Understanding Transboundary Pollution

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>
- Urbina, Ian (2008). "Growing Pains for a Deep-Sea Home Built of Subway Cars." *The New York Times* (April 8). Available at http://www.nytimes.com/2008/04/08/us/08reef.html?_r=0

PART I: Atmosphere and Pollution

January 31st (Friday): Earth's Atmosphere:

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

Week 2

February 4th (Tuesday): Atmospheric Pollution 1

1. Smog: Smoke + Fog
Cases studied: 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>
- Nature* (2019, July 12). “China feels the heat over rogue CFC emissions.” Available at <https://www.nature.com/articles/d41586-019-02109-2>
- The New York Times* (2018). “In a High-Stakes Environmental Whodunit, Many Clues Point to China.” Available at <https://www.nytimes.com/2018/06/24/world/asia/china-ozone-cfc.html>
- Schlanger, Zoe (2017). “The Story of the 27 Sudden Deaths in 1948 is a Bleak Reminder of Why America Needs Clear Air Laws.” *Quartz* (Nov. 1st). Available at <https://qz.com/1117029/the-sudden-death-of-26-people-in-a-tiny-american-town-on-halloween-weekend-shows-the-bleak-reality-of-life-before-clean-air-laws/>

February 7th (Friday): Atmosphere and Pollution 2:

1. Wildfires
2. Volcanic Eruptions
3. Aerosols

Required Materials:

- NASA (2010). “Aerosol: Tiny Particles, Big Impact.” Available at <https://earthobservatory.nasa.gov/features/Aerosols>
- Popovich, Nadja (2020). “Millions of Australians Are Choking on Smoke From Wildfires.” *The New York Times* (Jan. 3). Available at <https://www.nytimes.com/interactive/2020/01/03/climate/australia-fires-air.html>
- Rouwet, Dmitri, Tanyileke, and Coasta, Antonio (2016). “Cameroon’s Lake Nyos Gas Burst: 30 Years Later.” *Eos* (July 12). Available at <https://eos.org/meeting-reports/camerouns-lake-nyos-gas-burst-30-years-later>

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

Further Materials:

- Chapter 16, "Wild Fires."

Week 3

PART II: Hydrosphere and Pollution

February 11th (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* (5th edition)

February 14th (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)
- Lexology (2018). "Pollution in Oceans." Available at <https://www.lexology.com/library/detail.aspx?g=b5b618ab-f09d-43f4-a518-01b31599bf61>
- 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)
- Sloactive (2019). "Plastic Pollution." Available at <https://sloactive.com/plastic-pollution/>

Further Materials:

- Hoagland, P. and Schumacher, M.E. (2001). "Law of the Sea." *Encyclopedia of Ocean Sciences* (Second Edition). Available at <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/law-of-the-sea>

Week 4

February 18th (Tuesday): Oceans and Pollution 2:

1. Oil Spills

-Case: Deep Water Horizon (2010)

2. The New Arctic Exploitation and Pollution

Required 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/>

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

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

-*The New York Times* (2015). “Deepwater Horizon Oil Spill: An Interactive Look at What Happened.” Check the following sections:

a. Interactive Map: Tracking the Oil Spill

b. The Oil Spill’s Effects on Marine Life

Available at https://archive.nytimes.com/www.nytimes.com/interactive/us/spill_index.html

Further Materials:

-Hamilos, Paul (2013). “Spanish government cleared of blame for Prestige oil tanker disaster” *The Guardian* (Nov. 13). Available at <https://www.theguardian.com/world/2013/nov/13/spanish-prestige-oil-tanker-disaster>

February 21st (Friday): Oceans and Pollution 3:

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 5

February 25th (Tuesday): Rivers and Lakes Pollution 1

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

Required Materials:

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

February 28th (Friday): Rivers and Lakes Pollution 2

1. Transboundary Conflicts
2. Transboundary River Pollution
 - Cases: a. The Colorado River
 - b. The Tijuana River
3. The Aral Sea Disaster

Required Materials:

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

Further Materials:

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

Part IV: Energy Sources and Pollution

Week 6:

March 3rd (Tuesday): Nuclear Energy

-PAPER PROPOSAL DUE

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 6th (Friday): Nuclear Pollution

1. Radioactivity

2. Nuclear Residual Materials

3. Ocean Dumping Events and Transportation

4. Nuclear Reactor/Facility Accidents

- Cases:
 - a. Chernobyl (former USSR) (1986)
 - b. Kyshtym (former USSR) (1957)

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>

-Rabl, Thomas. “The Nuclear Disaster of Kyshtym 1957 and the Politics of the Cold War.” *Environment & Society Portal, Arcadia* (2012), no. 20. Rachel Carson Center for Environment and Society. <https://doi.org/10.5282/rcc/4967>

-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 7:

March 10th (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 13th (Friday): CLASS CANCELLED

NOTE:

a. The operation mode of the classes will be largely through “Discussion Board” (Blackboard) as a way to communicate. Every week the instructor will post a set of questions related to the week topic (e.g. tectonic plates). All of us will have to answer and

discuss those questions on this Blackboard section. The instructor will post these questions during every weekend and we will answer/discuss them through the rest of the week.

b. We will have also a Video-Conference class using a digital platform (Zoom). **It is NOT a requirement to participate in this virtual class, but JUST a COMPLEMENT of the Discussion Board.**

Dates and hours (Video-Conference class): **Tuesdays and Fridays 10:00 – 11:00am (via Zoom)**

NOTE: Please, check more details in the document “Emergency Instructions” located in “Courses Materials” (Blackboard) and also in Appendix 1 (at the end of the Syllabus)

Week 8:

March 17th (Tuesday): CLASS CANCELLED

March 20th (Friday): Beginning of the Distance-Learning Class: Coal and Pollution 2

1. Coal and Pollution
2. Coal and the Trans-border Pollution
3. Coal Mining Fire and Pollution: Centralia, Pennsylvania

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 24th (Tuesday): Petroleum and Pollution

1. Geological Formation
2. Extraction, Transportation, Refining, and Consumption
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/2e91c7211b4947de8837ebeda53080b9>
- Reisser, Wesley and Reisser, Colin (2019). Chapters 4, “Oil” in *Energy Resources: From Science to Society*
- Smith, Mitch and Bosman, Julie (2017). “Keystone Pipeline leaks 210,000 gallons of oil in South Dakota.” *The New York Times* (Nov. 16). Available at <https://www.nytimes.com/2017/11/16/us/keystone-pipeline-leaks-south-dakota.html>
- U.S. Environmental Protection Agency (EPA) (2015). “Assessments of the Potential Impacts of the Hydraulic Fracturing for Oil and Gas on Drinking Water Resources. Executive Summary (June). Available on EPA: “Fracking has no broad impact on drinking water” (US Today June 2015) at <http://www.usatoday.com/story/news/2015/06/04/fracking-epa-drinking-water/28510779/>

Part V: Ecosystems, Genetics, Invasive Species and Pollution

March 27th (Friday):

1. Genetic Modified Organisms (GMOs)
2. Invasive Species

Required 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
- DiBacco, Claudio et al. (2012). “Ballast water transport of non-indigenous zooplankton to Canadian ports.” *ICES Journal of Marine Science*, 69(3), 483-491. doi:10.1093/icesjms/fsr133
- Gallegos, Jenna (2017). “GMO salmon caught in U.S. regulatory net, but Canadians have eaten 5 tons.” *The Washington Post* (August 4). Available at https://www.washingtonpost.com/news/speaking-of-science/wp/2017/08/04/gmo-salmon-caught-in-u-s-regulatory-net-but-canadians-have-eaten-5-tons/?utm_term=.1695ac7c0ebc

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

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

Week 10:

March 31st (Tuesday): Discussion Session and Update of the Final Paper

April 3rd (Friday):

1. Airplane Traffic
2. Shipping Transportation

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 11:

April 7th (Tuesday): NO CLASS (classes follow Wednesday schedule)

April 10th (Friday): NO CLASS. SPRING BREAK

Week 12:

April 14th (Tuesday): NO CLASS. SPRING BREAK

Part VI: Garbage and Virtual Pollution

April 17th (Friday): Garbage

FINAL PAPER DUE

NOTE: You will send the Research Paper by email or Blackboard.

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. 25th, 2014) (Video). Available at <http://www.nytimes.com/video/nyregion/100000003131953/where-does-our-trash-go.html>
- Chapter 12: “Waste Disposal” in *Geohazards: Natural and Human* by Nicholas K. Coch
- The Freshkills Alliance (n.d.). “Freshkills Park.” Available at <http://freshkillspark.org/>

Week 13:

April 21st (Tuesday): Trans-Border Garbage

1. Trans-Border Garbage

2. Importing Trash and Electricity: Sweden
2. Ship Breakers: Bangladesh
3. E-Waste
4. *Cloud* garbage: Virus, Spams, and Trojans

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>
- 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/>
- 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>
- Scientific American* (2001, Oct. 19). “When did the term 'computer virus' arise?” Available at <https://www.scientificamerican.com/article/when-did-the-term-compute/>

April 24th (Friday): Virtual Pollution

1. Noise
2. Electromagnetic fields
3. Light
4. Thermal
5. Space: satellite junk and the Nemo Point’s garbage

Required Materials:

- 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>
- International Dark-Sky Association (2018). “Light Pollution.” Available at <https://www.darksky.org/light-pollution/>
- NASA (2013). “Space Debris and Human Spacecraft.” Available online at http://www.nasa.gov/mission_pages/station/news/orbital_debris.html
- “Noise Pollution” US Environmental Protection Agency (2015). Available at <http://www.epa.gov/air/noise.html>
- The Encyclopedia of Earth (2010). “Thermal Pollution.” Available at <http://www.eoearth.org/view/article/156599/>
- World Health Organization* (2015). “Electromagnetic Fields.” Available at <http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html>

Further Materials:

- “Light Pollution Map.” Available at <http://www.lightpollutionmap.info/#zoom=4&lat=5759860&lon=1619364&layers=B0TFFFFTT>
- “The Last Quiet Places: Silence and the Presence of Everything” in *On Being* by Gordon Hempton (audio-interview). Available at <https://onbeing.org/programs/gordon-hempton-the-last-quiet-places-silence-and-the-presence-of-everything/>

Part VII: Understanding the Current Ecological Crisis

Week 14:

April 28th (Tuesday): Climate Change: Facing the *Unknown*

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

Required Materials:

- Chapter 11: “Climate Change.”

May 1st (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”)
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-farmers-to-find-new-livelihoods-106048>
- Edwards, Rob (2005). “Rising sea levels may destroy nuclear dump.” *New Scientist* (June 28). Available at <https://www.newscientist.com/article/dn7591-rising-sea-levels-may-destroy-nuclear-dump/>
- 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-zombie-viruses-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-blob-ocean-seabirds-killed-new-zealand-north-america>

Week 15:

May 5 (Tuesday): Final Ecological Meditations about the Current Ecological Crisis

Required Materials:

- Davenport, Coral (2020). "Trump Removes Pollution Controls on Streams and Wetlands." *The New York Times* (Jan. 22). Available at <https://www.nytimes.com/2020/01/22/climate/trump-environment-water.html>
- Duggan, Jennifer (n. d.). "Inside the Doomsday 'Vault'"
- Hogenboom, Melissa (2019). "How Air Pollution is Doing More than Killing Us." *BBC* (April 16). Available at <https://www.bbc.com/future/article/20190415-how-air-pollution-is-doing-more-than-killing-us>
- "Iceland holds funeral for first glacier lost to climate change." *The Guardian* (2018). Available at <https://www.theguardian.com/world/2019/aug/19/iceland-holds-funeral-for-first-glacier-lost-to-climate-change>
- Zimmer, Carl (2020). "Air Pollution, Evolution, and the Fate of Billions of Humans." *The New York Times* (Jan.13). Available at <https://www.nytimes.com/2020/01/13/science/air-pollution-fires-genes.html>

Further Materials:

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

May 8th (Friday):

-PRESENTATIONS 1: We will present our Research Paper in Zoom (extra-credit)

Week 17:

May 12th (Tuesday):

-PRESENTATIONS 2: We will present our Research Paper in Zoom (extra-credit)

May 18th (Friday): 9:00am-11:00am Final Discussion of the Class

Appendix 1

Assignment Description

Assignments:

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

Undergraduate Students

1. Final research paper
 - a. Around 8 pages (~2,000 words)
 - b. at least 5 references
2. Research paper proposal (~2 pages)

3. Mid-Term exam: Required
5. Final exam: Required
6. Presentation of the Research Paper

Graduate Students

1. Final research paper
 - a. Around 10 pages
 - b. at least 10 references
2. Research paper proposal (~3 pages)
3. Abstract of the research paper:
Extra-credit (250 words plus keywords)
4. Mid-Term exam: Required
5. Final exam: Required
6. Presentation of the Research Paper

Evaluation:

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

	Percentage of Final Grade
Research paper proposal	20%
Final Research Paper	45%
Mid-term exam and Final exam (Discussion Board)	35%
Presentation of the Research Paper	(extra-credit; 5%)

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

	Percentage of Final Grade
Research paper proposal	20%
Final Research Paper	45%
Mid-term exam and Final exam (Discussion Board)	35%
Abstract of the research paper	(extra-credit 5%)
Presentation of the Research Paper	(extra-credit; 5%)

Description of the Assignments:

2. Mid-Term and Final Exams: We have decided that we will **NOT have Mid-Term and Final Exams**. This exercise will be substituted by our Discussion Board answers and Discussion.

2. Research Paper Proposal (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 socio-political and environmental impacts do renewable energy project generate? How have local communities accepted this type of energy plants?”
4. **Methodology**: 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:

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. 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>.

-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).

4. Class Participation: (In Discussion Board): SUBSTITUTION OF THE EXAMS

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