UCSF 137
The Scientific Basis of Environmental Issues
Rome—Spring 2019

Instructor: Marcello Di Paola, PhD
Phone (office): +39 (06) 355-881
Phone (mobile): +39 331 3314516925
Email: marcellodipaola80@gmail.com
Class Meetings: Monday, 9:30 a.m.–12:00 p.m.
Office Hours: Monday, 12.30pm-2.00pm

Core Area Satisfied:
This is a foundational scientific course as part of the Core Curriculum at Loyola University of Chicago.

Course Description:
Many of the most important policy and societal decisions of the 21st Century will be driven by environmental issues. These include planetary, systemic, complex problems the ramifications of which are only just beginning to be understood: climate change, biodiversity loss, pollution, and the challenge of providing sufficient resources to an ever increasing and increasingly more consumptive population. This course is designed to provide the scientific background needed to understand these issues, and discuss various challenges with the science/policy interface. The objective is to enable students to meaningfully participate in the policy discussions of the next several decades.

Course Objectives:
By the end of the semester, the students should be able to:
- exhibit knowledge of the main environmental issues of our times;
- recognize the interconnections among the different scientific disciplines and how their principles are used in investigating environmental issues;
- demonstrate understanding of basic physical and chemical principles underlying environmental science;
- exhibit knowledge of the philosophical complexities of scientific explanation;
- explain the difficulties inherent in the science-policy interface in modern societies;
- understand tensions between expertise, democratic political authority, and some forms of expertise denialism;
- understand and describe important cycles in nature.
Specific Goals:
1. Gaining factual knowledge (terminology, classifications, methods, trends) about the environment, how it has been changed, and where we are heading.
2. Learning fundamental principles, generalizations, and theories.
3. Gaining a broader understanding and appreciation of intellectual/cultural activity, primarily science.

Required Textbooks:

It is expected that students will get textbooks (possibly e-book) before course begins.

Other Resources:
4. Sakai connection
   Additional course materials will be also provided via the Sakai learning management system, which can be accessed at: https://sakai.luc.edu/
   It is expected that students will access and submit assignments and other coursework via the Sakai system using their Loyola ID and password.
   http://www.luc.edu/itrs/sakai/whatissakai/
   http://www.luc.edu/itrs/sakai/sakai-student-tutorials.shtml

Readings:
Weekly readings should be done prior to weekly meetings. Please keep up to date to ensure that you don’t miss anything. All the reading material might not be necessarily covered during class time, but it is still considered part of your work and may appear on quizzes and the exams.

Course Evaluation:
Your grade in the course will be based on:
20% quizzes (midterm exam included)
25% classroom participation and reflection
25% group presentations
30% final exam
Quizzes (20%):
Short quizzes (20-25 minute) will be focused on the lectures, readings and presentations covered and discussed during prior or day class. There will be also quizzes (45 minute) for all students in the scheduled mid-term examination.

Classroom participation and reflection (25%):
This course is dedicated to helping students become active participants in the policy discussions surrounding environmental issues. Students must be present during class sessions in order to receive credit as we will hold frequent discussions in the class. For these discussions, students will need to have done the reading ahead of time for class and be prepared. Your grade for this portion of the course will be based on the cogency of your comments (and questions), and the respect for all opinions that you exhibit as we will discuss some controversial questions. The lowest score will be dropped from your course evaluation.

Group presentations (25%):  
Students will be separated into groups of 2-5 people. Each group will prepare a presentation covering different topics of the course. Recent articles should be used to communicate the current status of the issue and include any controversies. Presentations should be around 20 minutes long and the presenting group should then lead and facilitate the class discussion.

Final Exam (30%):  
Students will have 2 hours to complete the exam. The final will include all material read and discussed throughout the term.

Attendance Policy
In accordance with the JFRC mission to promote a higher level of academic rigor, all courses adhere to the following absence policy:
- For all classes meeting once a week, students cannot incur more than one unexcused absence.
- For all classes meeting twice a week, students cannot incur more than two unexcused absences.
- For all classes meeting three times a week, students cannot incur more than two unexcused absences.
This course meets once a week, thus a total of one unexcused absence will be permitted. Unexcused absences beyond this will result in a lowering of your final grade.

Grading:  
Final letter grades will be calculated as follow, based on the cumulative percentage from the tasks described above:
Course Outline:
13th Sessions including 1 mid-term exam + final exam
The outline of the topics for each session is listed below:

Session 1 January 21, 2019

Introduction to the course (Christensen pp. 1-60)

- Description of the course: Objectives, distribution of sessions.
- Methodology of work: Participatory approach, preparatory material, questionnaires.
- Course evaluation: quizzes, group presentations, exams
- Introduction on humans and the environment
  - What is the environment? Who are these humans we speak of?
  - Temporal and spatial scales
  - Planetary Spheres
  - Ecosystems
  - Population Movements
  - Land Use Changes
  - The Anthropocene

Session 2 January 28, 2019

The principles of science and the scientific method (Rosenberg pp. 13-68)

- Science and Western Civilization
- Scientific Explanation
- Scientific Explanation and its Discontents

Session 3 February 4, 2019

Issues in Philosophy of Science (Rosenberg pp. 69-144)

- The Structure of Scientific Theories
- The Epistemology of Science
- Are There Any Scientific Facts?
### Session 4  February 11 2019

**Earth and Water**

**Air Quality and Pollution**

**Biodiversity**

(Christensen pp. 234-375)

### Session 5  February 18 2019

**Climate and climate change**  (Christensen, pp. 196-232)

- What is Climate? Difference between weather and climate
- How is climate investigated?
- What is climate change? Past climate changes and their effect.
- Reason for climate change: past climate changes, current climate change.
- Expected effects of climate change; empirical evidences, forecast and simulation.

### Session 6  February 25 2019

**Why We Disagree on Climate Change**  (excerpts from D. Jamieson, *Reason in a Dark Time, 2014*)

- Political disagreement
- Knowledge and political authority
- Cultural dissonance
- The economics of climate change
- Ethical disorientation

### Session 7  March 4 2019

**MID TERM EXAMINATION**

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**MARCH 11  NO CLASS / SPRING BREAK**
### Session 8  March 18 2019

**Agriculture and food**  *(Excerpts from L. Brown, *Full Planet, Empty Plates* 2011)*

- Trends
- How much food do we eat?
- How much food do we waste?
- What are we doing and how? The Food and Agriculture Organization

### Session 9  March 25 2019

**Non-renewable and renewable energy.**  *(Christensen, pp. 450-515)*

- Energy production, distribution and use
- The energy transition
- Renewable energy overview
- Increasing population, increasing demands

### Session 10  April 1 2019

**Urban Ecology, Human Growth, and Waste**  *(Christensen, pp. 516-579)*

### Session 11  April 8 2019

**Scientific expertise and the environment**  *(Oppenheimer et al. ch 1 and 4)*

- The Need for Expert Judgment

### Session 12  April 15 2019

**The Science/Policy Interface**  *(Oppenheimer et al. ch 5 and 6)*

- Patrolling the science/policy border
- What assessments do

### April 22 NO CLASS/EASTER RECESS

**Final Exam**  May 2 2019
**General Comments:**

The class will be centered around discussions of the topics listed on the syllabus. I will provide the scientific background for each topic, but student discussion and participation should lead to the greatest insight. Therefore, it is imperative that each student come to class prepared by having done the assigned activities for that day.

This is an interactive class, students should feel free to ask questions and make comments about the material we are discussing.

**Academic Honesty:**

Clear explanations of academic integrity at Loyola University of Chicago are provided at: http://www.luc.edu/education/resources/academic-policies/academic-integrity/

These policies will be enforced in this course and breaking them will automatically lead to zero points for the assessment task in question. I reserve the right to impose more severe penalties, including a grade of ‘F’ for the entire course. All breaches of the policy will be reported to your Dean’s office. For additional academic policies and procedures refer to:

http://www.luc.edu/education/academics_policies_main.shtml
**Accessibility:**

Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: [http://www.luc.edu/sswd/](http://www.luc.edu/sswd/)

**Academic Honesty**

Plagiarism and other forms of academic dishonesty are unacceptable at the JFRC and will be dealt with in accordance with Loyola University Chicago’s guidelines. Please familiarize yourself with Loyola’s standards here: [http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml](http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml)

You are responsible for understanding what constitutes plagiarism according to the LUC Student Handbook.

**Harassment (Bias Reporting):**

It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, colour, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behaviour threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfil its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias.

In order to uphold our mission as a Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith—any incident(s) of bias must be reported and appropriately addressed.

Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: [http://webapps.luc.edu/biasreporting/](http://webapps.luc.edu/biasreporting/)