# ENV 230—Global Climate Change

Autumn quarter, 2016

## Logistics

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**Office hours**: Monday & Wednesday 9:00–9:30 am (before class) or by appointment

**Class times**: Monday & Wednesday 9:40–11:10 am
**Class location**: Levan Center room 305
**Final project in place of exam due date**: Wednesday, Nov 16, 10:45 am
**Textbook** (required): *Dire Predictions: Understanding Global Warming*, *Second Edition*, 2015, Mann & Kump, 2015. ISBN-13: 978-1465433640.

## Course overview

The official description: "Climate change is a crucial issue facing society and involves intricate interactions between human pollution, processes in the Earth system and societal impacts. The course will cover the basic science of climate change and also consider its ethical dimensions. Solutions to climate change that incorporate sound science and social behavior will be explored through student-driven projects." This course is designed to convey the basic science of global climate change and to explore potential solutions to this complex problem. Global climate change involves complex interactions between emissions from human activities, processes in the atmosphere, biosphere and ocean, and societal impacts. After studying the science behind the greenhouse effect, we will review a range of topics associated with global climate change. These topics will be developed with the perspective of Earth as an integrated system having properties including both stability/resilience and the capacity for sudden and non-linear change. The course will be primarily based on recent research findings and syntheses presented by the Intergovernmental Panel on Climate Change (Fifth Assessment Report, 2013) and other recent reports on climate change. Our coverage of this report will provide students with an understanding of the science behind media headlines. Using the knowledge developed in this class, students will create final projects that explore solutions to the problem of global climate change. The over-arching objective of this class is a solid understanding of global climate change science and an appreciation of the challenges in creating solutions to this environmental problem.

## Course philosophy

We will strive to have an interactive discussion on the topics addressed in this class. Science is difficult to learn passively—classroom participation promotes active learning. Student learning is the focus of this class, and student participation and feedback will help us to reach the objectives of the course. Students will be encouraged to provide both formal and informal feedback throughout the quarter on course direction, topics and teaching methodology. Also, helpful criticism is always appreciated via email, office hours and after class.

## Class structure and details

**Monday article presentations**: Based on the same groups assigned for the solutions project (see below), every Monday class in Weeks 3–9 will have a presentation on an article selected by one or two of the groups. The article must pertain to some aspect of the group's presentation topic. The group will briefly summarize the article and then lead a brief discussion (~10 minutes total). The group must email me their article **one week prior** to presentation for full credit. The evaluation instrument for the article presentation is posted on D2L.

**Wednesday quizzes**: On Wednesdays for Weeks 2–8, the class will start with a short low-stakes quiz based on the material presented during the previous week in lecture (which often spills into Monday). This quiz will evaluate your understanding of the lecture material and help prepare you for the midterm exam. Completion of the quiz will be worth 50% of the grade in an effort to lower anxiety. The lowest quiz grade will be dropped.

**Wednesday discussion**: Each Wednesday class for Weeks 2–8 will have a reading assignment provided on the D2L site. Associated with the reading, there will be some discussion questions. Each Wednesday, we will spend 10–15 minutes talking over the readings. The questions are designed to provide each student with a baseline of information and as a starting point for our discussion. Written answers to the questions should be submitted via the D2L site. The assessment instrument I will use is posted on D2L. These assignments are due at midnight of the day BEFORE class. So, Wednesday's discussion questions are due at 11:59 pm on the preceding Tuesday. To allow for an evolution of discussion topics, the readings and questions will be posted online after the preceding Wednesday's class. I will drop your lowest score in this category, so you can miss one of these assignments without penalty.

**Solutions project**: Groups of four students will create final presentations that cover a possible "solution" to the issue of global climate change. Solutions should focus on either reducing greenhouse gas concentrations or mitigating the effects of climate change. The format of the presentation is left open, but should meet the following guidelines. You will have 20 minutes to present, which needs to include at least 5 minutes of class discussion based on questions you provide one week prior to your presentation. The group's presentation will count as 70% of the grade. An initial literature review (a bibliography with at least 10 sources, 5 of which are peer-reviewed) is due **Friday, Oct 7** (10%). A formal project proposal is due on **Monday, Oct 24** (20%) and should include a detailed outline of slides/presentation content and a 500 word abstract detailing the concepts addressed in the presentation. Finally, EACH student will INDIVIDUALLY submit a one-page (500–600 word) policy brief that details legislation that could support their solution (due at the end of our scheduled exam period at 10:45 am on **Wednesday, Nov 16**).

**Exam**: There will be an exam for the course given in class on **Wednesday, Nov 2**. This exam will focus on the science of climate change presented during the lectures. Instead of a final exam, the policy brief related to the solutions project will be due **Wednesday, Nov 16** at 10:45 am via D2L.

**Attendance**: Attendance is required for all classes. Students will be allowed to miss two classes without penalty during the quarter. This should cover all 'routine' absences such as illness, doctor appointments, etc. Further excused absences will only be granted in exceptional circumstances with appropriate

documentation. Since one quiz grade can be dropped, missing one Monday will not affect your final grade. If you miss a Wednesday discussion, you are still required to turn in your discussion questions online. Because the class structure relies on your participation for the article discussion, being absent when you are scheduled to present cannot be excused. After the first two absences, approximately ½ a percentage point for each missed class will be taken off your final grade. Exams must be taken at the scheduled time. Any exceptions to this policy must be arranged in advance (for example, athletic competitions).

**Desire2Learn (D2L)**: In an effort to reduce paper usage, all class materials and grades will be available on the D2L site. I will post all lectures on the D2L site. We will also use D2L for all assignment submissions.

**Late assignments**: All assignments are due at 11:59 pm via D2L with the following exceptions. The discussion questions are due at 11:59 pm the day before class (Tuesday night). The final project is due at 10:45 am, which is the end of our assigned exam period, as is required by university policy. Any late assignments received after due date will have a penalty. Assignments less than one day late (or before class for the discussion questions) will have 10% deducted. Assignments late by more than one day but less than one week will have 20% deducted. After one week, assignments will have 40% deducted. No assignments will be accepted after the final exam time of **Wednesday, Nov 16** at 10:45 am.

**Technology use**: Although technology use in the classroom has many benefits, it can also be distracting to both the user and other students. We will try to use technology in beneficial ways, including an innovative polling method based on text messaging. But outside of this use, please refrain from using your cell phone (text messaging included), laptop and tablet during our lectures. If you use one of these devices to take notes, please let me know so we can make appropriate arrangements.

**Academic Integrity:** Work done for this course must adhere to the University Academic Integrity Policy. According to the DePaul University Student Handbook, "Violations of academic integrity include but are not limited to the following categories: cheating; plagiarism; fabrication; falsification or sabotage of research data; destruction or misuse of the university's academic resources, alteration or falsification of academic records; academic misconduct; and complicity." The Handbook also states that, "If an instructor finds that a student has violated the Academic Integrity Policy, the appropriate initial sanction is at the instructor's discretion." To support this policy, your assignments may be submitted to the website turnitin.com. For more information, definitions, and examples, see DePaul University's Academic Integrity website at http://academicintegrity.depaul.edu.

## Grading

Grades in this class will be determined on the following scale:

| >=93 | 92–90 | 89–87 | 86–83 | 82–80 | 79–77 | 76–73 | 72–70 | 69–67 | 66–60 | <60 |
|---|---|---|---|---|---|---|---|---|---|---|
| **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **C-** | **D+** | **D** | **F** |

I may change these grade boundaries, but this will always be in favor of the students and will be applied uniformly to the entire class. Grades will be determined from the individual components of the course by the following allocation:

| Attendance | Discussion questions | Quizzes | Article presentation | Exam | Solutions project | Policy brief |
|---|---|---|---|---|---|---|
| 10% | 15% | 10% | 5% | 25% | 20% | 15% |

## Sources of help

Students seeking disability-related accommodations are required to register with DePaul's Center for Students with Disabilities (CSD) enabling you to access accommodations and support services to assist your success. There are two office locations that can provide you with enrollment information, or inquire via email at csd@depaul.edu.

- Loop Campus - Lewis Center #1420 - (312) 362-8002
- Lincoln Park Campus - Student Center #370 - (773) 325-1677

Students are also invited to contact me privately to discuss your challenges and how I may assist in facilitating the accommodations you will use during this course. This is best done early in the term and our conversation will remain confidential. Some additional sources of assistance:

- **Writing Center**: for students who need help with writing
- **Dean of Students**: accommodations with health or family emergencies

## Scientific Inquiry domain

Courses in the Scientific Inquiry domain are designed to provide students with an opportunity to learn the methods of modern science and its impact on the world around us. Courses are designed to help students develop a more complete perspective about science and the scientific process, including: an understanding of the major principles guiding modern scientific thought; a comprehension of the varying approaches and aspects of science; an appreciation of the connection among the sciences; the fundamental role of mathematics in practicing science; an awareness of the roles and limitations of theories and models in interpreting, understanding, and predicting natural phenomena; and a realization of how these theories and models change or are supplanted as our knowledge increases.

## Goals and Learning Outcomes

Below are listed the learning goals and outcomes for the Science Inquiry-Elective Domain. Each goal is listed followed by learning outcomes associated with the goal.

1. Students will be able to apply appropriate concepts, tools, and techniques of scientific inquiry.
2. Students will be able to describe how natural scientific, mathematical, and/or computational methodologies function as mechanisms for inquiry.
3. Students will be able to explain the interaction between the content of their SI-Elective course and other scientific disciplines or the broader society.

## Upon completion of this class, you will be able to explain (class-specific learning outcomes):

- What global climate change is
- The greenhouse effect and how fossil-fuel combustion increases surface temperatures by ramping up the greenhouse effect
- How climate feedbacks amplify or diminish climate forcings
- How knowledge of the Earth's past climates improves our ability to understand climate change
- The global carbon cycle has been perturbed
- How global climate models are used to predict future climate change
- The strengths and weaknesses of proposed strategies to reduce carbon dioxide emissions
- Appreciate the ethical dimensions of climate change impacts and proposed reduction strategies

## Syllabus

| Week | Dates | Monday | Wednesday |
|---|---|---|---|
| 1 | Sep 7 | *No class* | Introduction and logistics |
| 2 | Sep 12 & 14 | The basics of climate change **(select project topics in class)** | |
| 3 | Sep 19 & 21 | Feedbacks | |
| 4 | Sep 26 & 28 | Climate modeling **(course feedback in class)** | |
| 5 | Oct 3 & 5 | Short-lived climate pollutants and fracking **(project literature review due Oct 7)** | |
| 6 | Oct 10 & 12 | Paleoclimate | |
| 7 | Oct 17 & 19 | Extreme weather and abrupt climate change | |
| 8 | Oct 24 & 26 | Climate change impacts and ethics **(project proposals due Oct 24)** | |
| 9 | Oct 31 & Nov 2 | Review/catch up | **Midterm** |
| 10 | Nov 7 & 9 | Student presentations | Student presentations |
| 11 | Nov 14 | Wrap up (class held in McGowan South 204) | *No class* **(policy brief due Nov 16)** |

**There will be quizzes and article discussions on Wednesdays during Weeks 2 – 8 and groups will present article discussions on Mondays during Weeks 3 – 9.**

The above schedule is a framework, and changes will be communicated in class and via the D2L site.