SIO25: Climate Change and Society WI21

Dr. Jane L. Teranes

Remote Lectures: MWF 10:00-10:50am

Professor Teranes' Office hours: Wed 2 -4 pm, office hours
I am also available by email and by appointment.
e-mail: jteranes@ucsd.edu **Course website:** canvas.ucsd.edu

Your graduate student Teaching Assistants (TAs)
Julia Dohner (jdohner@ucsd.edu) Sections A01 (Thurs.10:00 am) & A02 (Thurs. 11:00 am)
Isabella Doohan (idoohan@ucsd.edu) Sections A03 (Thurs. 2:30 pm) & A04 (Thurs. 3:30 pm)

COURSE OBJECTIVES

This course will focus on scientific understanding of global climate change, an understanding of mitigation and adaptation options, and an examination of policy questions. By the end of this course, you should be able to (1) understand and describe the physical basis of climate change; (2) identify and explain global symptoms of climate change (3) be familiar with technological, economic and political solutions for mitigation (i.e. reducing greenhouse gas emissions) and adaptation (4) be able to effectively engage in the public policy debate on climate change solutions and (5) be able to accurately and effectively relate information on climate change to a general public audience.

COURSE READING ASSIGNMENTS

Required Book: Introduction to Modern Climate Change 2nd edition, Andrew Dessler, Cambridge University Press. 2016. This required textbook is available for purchase in the UCSD bookstore. You can also purchase or rent a copy or an *etextbook* at amazon.com or several other on-line book providers.

Additional articles: We will also read several additional government reports, journal articles and news articles throughout the quarter. Generally, you will access these articles online, and the websites will be provided on the syllabus or added on the course website. The most important of these readings, and how they are abbreviated on the syllabus, are listed below.

1) The 2013 Intergovernmental Panel on Climate Change Assessment Report 5 (2013) Working Group 1 Summary for Policy Makers (IPCC AR5 SPM) https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_SPM_FINAL.pdf
2) The 2017 Fourth National Climate Assessment Vol I, Climate Science Special Report (NCA4, Climate Science). https://science2017.globalchange.gov/
3) The 2018 Intergovernmental Panel on Climate Change Special Report 1.5°C Summary for Policy Makers. (IPCC SR15 SPM) https://www.ipcc.ch/sr15/
4) Bending the Curve: Ten scalable solutions for carbon neutrality and climate stability, executive summary. University of California (Bending the Curve) https://uc-carbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf

COURSE FORMAT

Class will consist of remote lectures (given over zoom at the posted lecture time), assigned reading, in-class zoom poll questions, in-class discussion, homework assignments, two mid-terms and a final. The lectures and required reading assignments form the significant portion of the class material and zoom poll questions will regularly assess your understanding of the material. Weekly homework assignments will give you practice and experience with the material in the reading and the lecturers. The two mid-terms and a final will be given online using the canvas "quiz" function, and will assess your overall understanding of the course material.

Students are expected to attend remote lectures and the weekly discussion sections over zoom **synchronously** whenever possible. If you are not able to attend synchronously, the zoom lectures and discussion sections will be recorded and posted on canvas, where you will be able to view them asynchronously. Lectures and discussion sections are an important aspect of the course, and attending these regularly will greatly enhance your ability to achieve the course objectives and, thus, to earn a good grade in the course. Participating in lectures synchronously will also provide opportunities for students to participate in real time polls to test their knowledge, and to engage in in-class discussions with their peers. Discussion sections, run by your TAs, will provide an opportunity for you to clarify homework assignments, lecture and reading material, ask questions about grading or other feedback, and to discuss course topics in even more detail with a group of your peers.

COURSE POLICIES

Statement on Remote Learning. Keeping up with lecture material and assigned reading is a student's obligation, as is a responsibility for all the work of class meetings, including tests and written assignments. However, I also recognize that we all might be facing compounding stresses as we strive to maintain academic excellence in this unfamiliar and remote learning format. Please feel free to contact me if you are experiencing any possible access limitations or infrastructure deficits (i.e. a lack of study space, computing resources, WiFi etc.) that is preventing you for engaging fully in the course material. Late assignments will not generally be accepted – however, if you feel that an exception is warranted, please discuss this with your TA or the instructor and we will be happy to arrange reasonable accommodations for your situation. At times we might all find it useful to talk opening about the on-going pandemic, our national political strife, pervasive racial inequalities, and what we are all feeling in response. We will conduct this class in an atmosphere of mutual respect and I encourage everyone's active participation. Integrity, honesty and respect are expected of all participants in their relations with other students, TAs and instructors.

Extra Credit. There will be various extra-credit opportunities throughout the course. Some opportunities will be available during in-class discussion and other opportunities will be for outside of class time, including some opportunities that can be completed asynchronously.

Statement on Diversity and Inclusion. I will strive to create a learning environment that supports a diversity of thoughts, perspectives and experiences, and honors your identities,

including race, gender, class, sexuality, religion, ability, etc. I will also ask you all to support and respect the diverse experiences and perspectives of your classmates. Towards these goals:

- If you have a preferred name and/or pronouns that we can recognize, please let us know!
- If you feel like your performance in the class is negatively impacted by experiences or situations related to the pandemic, inequalities, etc., in or outside of class, please come and talk with me. I want to be a resource for you, and I am happy to discuss possibilities for flexibility and accommodations to help you succeed in your academic goals.

I recognize that the field of climate science, like most of earth science, **historically** includes only a small subset of privileged voices. While we will make an effort to read scientific thought and listen to lectures from a diverse group of national and international scientists, limits do exist. In class, we will discuss issues of diversity in climate sciences and we will deliberate the socioeconomic and racial inequalities in the consequences of climate changes. We will also acknowledge that broadening participation in the field of earth sciences and climate sciences is a national priority. You are encouraged to contact me in person or electronically or submit anonymous feedback if you have any suggestions to improve the quality of the course materials.

Statement on Academic Integrity. Integrity of scholarship is essential for an academic community, especially during remote learning. This course will adhere strictly to the UCSD policy on academic integrity: "Students are expected to do their own work without unauthorized aids of any kind," as outlined in the UCSD Policy on Integrity of Scholarship. In particular, students agree that by taking this course, all required written homework and scholarship will be their own writing and sources will all be correctly referenced. Cheating on exams will not be tolerated and all detections of cheating will be considered academic misconduct and subject to disciplinary process. For more details on what constitutes cheating see here: https://academicintegrity.ucsd.edu/excel-integrity/define-cheating/index.html.

ADA statement: Your instructor and your TAs are happy to provide accommodations for this course for students with documented disabilities. Students must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD). I request contact from the student and the OSD office be provided in advance so that accommodations may be arranged.

GRADING:
30% Homework assignments (assigned approximately weekly)
40% Two mid-term exams (20% each)
30% Final Exam (cumulative)
Extra credit: Extra-credit will available periodically to students who volunteer to comment during in-class discussions. Additional campus seminars and other campus opportunities to earn extra credit will be announced **in class** throughout the quarter.

COURSE SCHEDULE*

Meeting Type and Date	Topic	Assignments and Reading
	Week 1	
Lecture January 4	Top 10 Climate Stories of 2020 …and what to expect in 2021	Read the course syllabus
Lecture January 6	Understanding Climate: A Primer	Dessler, Chapter 1
Discussion Sections January 7	*Introductions* *And discussion of the NYTimes OpEd by Al Gore*	*https://www.nytimes.com/2020/12/12/opinion/sunday/biden-climate-change-al-gore.html*
Lecture January 8	Who's Responsible?	Dessler, Chapter 1
	Week 2	
Lecture January 11	How is the Climate Changing?	Dessler, Chapter 2 NCA4, Climate Science Ch.1
Lecture January 13	Paleoclimate: A Long View of Climate Change	Dessler, Chapter 2
Discussion Section January 14	*Lecture review and Questions on HW #1*	
Lecture January 15	The Symptoms of Climate Change: Large-Scale Circulation and Climate Variability	Dessler, Chapter 9 **Homework #1 Due**
	Week 3	
No Class January 18	Martin Luther King Day Holiday	
Lecture January 20	The Symptoms of Climate Change: Extreme weather	Dessler, Chapter 9 NCA4, Climate Science Exec Summary
Discussion Section January 21	*Lecture review and questions on HW #2*	
Lecture January 22	The Symptoms: Shrinking Snowpack, Melting Ice	Dessler, Chapter 9 NCA4, Climate Science Ch.11 **Homework #2 Due**
	Week 4	
Lecture January 25	The Symptoms: Changing Oceans - Sea Level Rise and Ocean Acidification	NCA4, Climate Science Ch.12
Lecture January 27	The Symptoms: Ecosystems and Agriculture	Dessler, Chapter 9 https://nca2018.globalchange.gov/chapter/7/
Discussion Section January 28	*Review for Midterm #1*	No homework this week
Midterm January 29	**Midterm #1**	

	Week 5	
Lecture February 1	The Science: Greenhouse Gases and the Greenhouse Effect	Dessler, Chapter 5, section 5.1 https://www.epa.gov/climate-indicators/greenhouse-gases
Lecture February 3	The Science: Radiation and Energy Balance	Dessler, Chapter 3 NCA4, Climate Science Ch.2
Discussion Section February 4	*Lecture Review and questions on HW #3*	
Lecture February 5	The Science: A simple climate model	Dessler, Chapter 4 **Homework #3 Due**
	Week 6	
Lecture February 8	The Science: The Carbon Cycle	Dessler, Chapter 5
Lecture Feb. 10	The Science: Climate Forcing, Feedbacks and Sensitivity	Dessler, Chapter 6 Reread: IPCC AR5 SPM section C
Discussion Section February 11	*Lecture Review and questions on HW #4*	
Lecture February 12	The Science: Putting it all together	Dessler, Chapter 7 NCA4, Climate Science Ch.3 IPCC AR5 SPM section D **Homework #4 Due**
	Week 7	
No Class February 15	Presidents' Day Holiday	
Lecture February 17	What the Future Holds: Climate Scenarios	Dessler, Chapter 8 NCA4, Climate Science Ch.4 IPCC AR5 SPM section E.1-7
Discussion Section February 18	*Lecture Review and questions on HW #5*	
Lecture February 19	Climate Change Solutions: A Primer	**Homework #5 Due**
	Week 8	
Lecture February 22	What the Future Holds: Climate Stabilization, Climate Change Commitment and Irreversibility	Dessler, Chapter 10 IPCC AR5 SPM section E.8 IPCC AR5 SPM section D **Homework #5 Due**
Lecture February 24	Climate Change Solutions: Adaptation	Dessler, Chapter 11
Discussion Section February 25	*Review for Midterm #2*	No Homework this week
Midterm February 26	**Midterm #2**	

	Week 9	
Lecture March 1	Climate Change Solutions: Mitigation	Dessler, Chapter 12 NCA4, Climate Science Ch. 14
Lecture March 3	Climate Change Solutions: Climate Science and Policy The Paris Climate Accord	Dessler, Chapter 13
Discussion Section March 4	*Lecture Review and questions on HW #6*	
Lecture March 5	Climate Change Solutions: What will it take to "fix" the climate?	Dessler, Chapter 14 **Homework #6 Due**
	Week 10	
Lecture March 8	Understanding the impacts of 1.5°C warming	IPCC SP15 SPM Sections A-C https://www.ipcc.ch/sr15/
Lecture March 10	The impacts of 1.5°C warming and the sustainable development goals	IPCC SP15 SPM Sections D https://www.ipcc.ch/sr15/
Discussion Section March 11	*Questions on HW #7 and review for final*	
Lecture March 12	University of California report – Bending the Curve	Bending the Curve Executive Summary **Homework #7 Due**
Final Exam March 19	**Final Exam 8:00 AM**	

***Note:** The schedule of topics and assignments set forth in this syllabus is tentative and may be modified as needed throughout the quarter. In particular, additional required reading may be assigned. Notice of such changes will be by announcement in class or by written or email notice and any updates or changes to this syllabus will be posted on the course website at canvas.ucsd.edu