

## SIO25: Climate Change and Society WI22

Dr. Jane L. Teranes

Lectures: MWF 3:00-3:50pm, Center Hall 212

Note: Lectures will be held remotely on Zoom for at least the first four weeks of the quarter. Please use this link to join: <https://ucsd.zoom.us/j/93956216334>. Please check your canvas course website frequently for more information and for course updates. I plan to resume to in person teaching as soon as the campus reopens for instruction.

**Professor Teranes' Office hours:** Wed 4-5 pm. For at least the first four weeks of the quarter, please join on the lecture zoom immediately following class <https://ucsd.zoom.us/j/93956216334>. After that I will be available for office hours outside our course lecture hall. I am also available by email and by appointment.

**e-mail:** [jteranes@ucsd.edu](mailto:jteranes@ucsd.edu) **Course website:** [canvas.ucsd.edu](https://canvas.ucsd.edu)

### Your graduate student Teaching Assistants (TAs)

Rachel Darling ([rtdarlin@ucsd.edu](mailto:rtdarlin@ucsd.edu)), Monday Discussion Sections

Isabella Doohan ([idoohan@ucsd.edu](mailto:idoohan@ucsd.edu)), Friday Discussion Sections

### 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 3<sup>rd</sup> edition, Andrew Dessler, Cambridge University Press. 2021. This required textbook is available for purchase in the UCSD bookstore or at Amazon. For other options (including ebooks), you can go to the publisher website: <https://www.cambridge.org/highereducation/books/introduction-to-modern-climate-change/AD26BD3227322A87F72BEEA655AB1CF7#overview> (Links to an external site.) Or, purchase on VitalSource here: <https://www.vitalsource.com/products/introduction-to-modern-climate-change-andrew-e-dessler-v9781108888578> (Links to an external site.)

**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) Intergovernmental Panel on Climate Change Assessment Report 6 (2021)  
Working Group 1 Summary for Policy Makers (IPCC AR6 SPM)  
[https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf)
- 2) The 2018 Intergovernmental Panel on Climate Change Special Report 1.5°C  
Summary for Policy Makers. (IPCC SR15 SPM)

- <https://www.ipcc.ch/sr15/>
- 3) 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](https://uc-carbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf)

### **COURSE FORMAT**

Class will consist of course lectures assigned reading, in-class 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 poll questions will help regularly assess your understanding of the material. Weekly homework assignments will give you practice and experience with the material in the reading and the lectures. The two mid-terms and a final will assess your overall understanding of the course material. The format of the exams will be decided closer to the exam dates in accordance with current campus protocols.

Students are expected to attend lectures and the weekly discussion sections over zoom or in person **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. When we return to Center Hall, the lectures will be podcast. 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 learning during a pandemic.** 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 homework assignments. However, I also recognize that we all might be facing compounding stresses as we strive to maintain academic excellence in this uncertain and rapidly changing 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 from 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, etc. 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. More information on opportunities will be given throughout the course.

**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:**

20% Homework assignments (assigned approximately weekly)  
50% Two mid-term exams (25% each)  
30% Final Exam (cumulative)

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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\***

<b>Meeting Type and Date</b>	<b>Topic</b>	<b>Assignments and Reading</b>
	<b>Week 1</b>	
Lecture January 3	Top 10 Climate Stories of 2021 ...and what to expect in 2022	Read the course syllabus
Lecture January 5	Understanding Climate: A Primer	Dessler, Chapter 1
Lecture January 7	Who's Responsible?	Dessler, Chapter 1
<i>Discussion Section</i> January 7	<i>Introductions</i> <i>Discussion of Homework #1</i>	
	<b>Week 2</b>	
<i>Discussion Section</i> January 10	<i>Introductions</i> <i>Discussion of Homework #1</i>	
Lecture January 10	How is the Climate Changing?	Dessler, Chapter 2 IPCC AR6 SPM: Part A
Lecture January 12	Paleoclimate: A Long View of Climate Change	Dessler, Chapter 2 <b>Homework #1 Due</b>
Lecture January 14	The Symptoms of Climate Change: Extreme weather	Dessler, Chapter 9 IPCC AR6 SPM: Part A
<i>Discussion Section</i> January 14	<i>No discussion section</i>	
	<b>Week 3</b>	
January 17	Martin Luther King Day Holiday <b>No lecture and no discussion section</b>	
Lecture January 19	The Symptoms of Climate Change: Shrinking Snowpack, Melting Ice	Dessler, Chapter 9 <b>Homework #2 Due</b>
Lecture January 21	The Symptoms: Changing Oceans - Sea Level Rise and Ocean Acidification	Dessler, Chapter 9
<i>Discussion Section</i> January 21	<i>Lecture review and homework discussion</i>	
	<b>Week 4</b>	
<i>Discussion Section</i> January 24	<i>Lecture review and homework discussion</i>	
Lecture January 24	The Symptoms: Ecosystems and Agriculture	Dessler, Chapter 9 IPCC AR6 SPM: Part A
Lecture January 26	The Science: Greenhouse Gases and the Greenhouse Effect	Dessler, Ch. 5, section 5.1, 5.7 & 5.8 <b>Homework #3 Due</b>
Lecture January 28	The Science of Climate Change: Radiation	Dessler, Chapter 3
<i>Discussion Section</i> January 28	<i>TA office hours</i>	

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	<b>Week 5</b>	
<i>Discussion Section</i> January 31	<i>TA office hours</i>	
Lecture January 31	The Science of Climate Change: Energy Balance	Dessler, Chapter 3
Midterm February 2	<b>Midterm #1</b>	
Lecture February 4	The Science: A simple climate model	Dessler, Chapter 4
<i>Discussion Section</i> February 4	<i>Lecture review and homework discussion</i>	
	<b>Week 6</b>	
<i>Discussion Section</i> February 7	<i>Lecture review and homework discussion</i>	
Lecture February 7	The Science: The Carbon Cycle	Dessler, Chapter 5
Lecture February 9	The Science: Climate Forcing, Feedbacks and Sensitivity	Dessler, Chapter 6 Reread: IPCC AR6 SPM section C
Lecture February 11	The Science: Putting it all together	Dessler, Chapters 6 and 7 <b>Homework #4 Due</b>
<i>Discussion Section</i> February 11	<i>Lecture review and homework discussion</i>	
	<b>Week 7</b>	
<i>Discussion Section</i> February 14	<i>Lecture review and homework discussion</i>	
February 14	What the Future Holds: Emission Scenarios	Dessler, Chapter 8 IPCC AR6 SPM Section B
Lecture February 16	What the Future Holds: Predictions of Future Climate Change	Dessler, Chapter 8 IPCC AR6 SPM Section B <b>Homework #5 Due</b>
Lecture February 18	What the Future Holds: Climate Stabilization, Climate Change Commitment and Irreversibility	IPCC AR6 SPM Section D
<i>Discussion Section</i> February 18	<i>No discussion section</i>	
	<b>Week 8</b>	
Lecture Feb. 21	Presidents' Day Holiday <b>No lecture and no discussion section</b>	
Midterm Feb. 23	<b>Midterm #2</b>	
Lecture Feb.25	Climate Change Solutions: A Primer	Dessler, Chapter 11
<i>Discussion Section</i> Feb 25	<i>Lecture review and homework discussion</i>	
	<b>Week 9</b>	
<i>Discussion Section</i> Feb 28	<i>Lecture review and homework discussion</i>	
Lecture Feb 28	Climate Change Solutions: Mitigation Policies	Dessler, Chapter 12

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Lecture March 2	History of Climate Science and Politics	Dessler, Chapter 13 <b>Homework #6 Due</b>
Lecture March 4	Climate Change Solutions: What will it take to “fix” the climate?	Dessler, Chapter 14 IPCC AR6 SPM Section D
<i>Discussion Section</i> March 4	<i>Lecture review and homework discussion</i>	
	<b>Week 10</b>	
<i>Discussion Section</i> March 7	<i>Lecture review and homework discussion</i>	
Lecture March 7	Understanding the impacts of 1.5°C warming	IPCC SP15 SPM Sections A-C <a href="https://www.ipcc.ch/sr15/">https://www.ipcc.ch/sr15/</a>
Lecture March 9	The impacts of 1.5°C warming and the sustainable development goals	IPCC SP15 SPM Sections D <a href="https://www.ipcc.ch/sr15/">https://www.ipcc.ch/sr15/</a>
Lecture March 11	University of California report – Bending the Curve	Bending the Curve Executive Summary <b>Homework #7 Due</b>
<b>Final Exam</b> March 16	<b>Final Exam 3:00 PM</b>	

**\*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](http://canvas.ucsd.edu)