

ESYS 103 Environmental Challenges: Science and Solutions **Dr. Jane L. Teranes, Spring 2021**

Instructor: Dr. Jane L. Teranes

Office Hours: TH 2:00p - 4:00p Zoom meeting ID: 915 2088 3180

Lectures: Mon/Wed/Fri 1:00-1:50 pm, Zoom meeting ID: 979 0576 6515

Final Exam: TBA

TAs: Isabella Doohan (idoohan@ucsd.edu)

Aurora (Rory) Guild (aguild@ucsd.edu)

TAs are available during the discussion sessions or by appointment.

Reader: Paige Kauffman (pkauffma@ucsd.edu)

Contact for an appointment.

Discussion: W 2:00p-2:50 p (TA: Isabella Doohan)

W 3:00p-3:50p (TA: Isabella Doohan, Grader: Paige Kauffman)

TH 5:00p-5:50p (TA: Rory Guild)

TH 6:00p-6:50p (TA: Rory Guild, Grader: Paige Kauffman)

Website: <https://canvas.ucsd.edu>

Description: This course will examine several of the most significant global environmental challenges. The focus will then shift to strategies for addressing these challenges through engineering and design approaches, planning, governmental actions, international cooperation and social action. The goal is to identify the framework for a response that will transition us to a more sustainable future. The course examines three interacting challenges:

1. The *environmental crisis*: pollution, climate change, biodiversity loss, food scarcity, land degradation, water resources, energy needs.
2. The *social crisis*: The polarization between globalized rich and localized poor; the exclusion of most of the world's inhabitants; failed states.
3. The *economic crisis*: The effects of a sustained period of economic globalization that does not respect the carrying capacity of natural systems, decoupling of economic growth from human well-being and security.

All of these challenges are exacerbated by exponential population growth.

Fundamental global issues, rather than detailed technical and scientific analyses, are the major focus of this course. The mode of class delivery will be zoom-lectures (available synchronous and asynchronous modes), discussion, and discussion sections. Assignments will include short on-line quizzes, weekly written assignments, and a term paper intended to develop and synthesize solutions. A midterm exam and a final exam will test basic comprehension of the reading and lecture material.

Learning Objectives: By the end of the course, the student should understand and be able to discuss:

- The nature and extent of the current environmental, social and economic crises that need to be addressed to ensure sustainable development.
- The central roles played by market forces, technological innovation and governmental policies.

- Environmental aspects of specific industrial sectors, such as energy, transportation, agriculture, manufacturing, and the built environment.
- Engineering and design approaches to minimize the environmental impacts of human activity.
- An appreciation of how people and organizations take actions to prevent environmental economic collapse.

This course will employ and develop the following skills: critical thinking, effective writing, project design, analyzing and understanding information from multiple sources and multiple points of view, active listening and discussion skills, understanding the processes of implementing solutions.

Schedule: This is a weekly schedule of topics. Detailed weekly reading and assignments will be posted on canvas every week.

Part I: Environmental Challenges

Week 1: Introduction: The Coupled Human-Environmental System

Week 2: Climate Change

Week 3: Population Pressure: Food, Land and Water

Week 4: Biodiversity Loss, Threatened Ecosystems

Part II: The Response

Week 5: Sustainable Development Goals

Week 6: Stabilizing Climate: New Energy Sources

Week 7: Climate Action Plans, Urban Planning and Design

Week 8: Energy, Water and Building Efficiency

Week 9: Valuing Nature and Water Resources

Week 10: Feeding 9-10 Billion People Well

Reading: Readings will be assigned weekly and will be made available in electronic form through links and .pdfs posted in canvas. These will be posted on a weekly basis. It is important to keep up with the weekly reading. **Important:** The reading assigned for each lecture should be completed **before** the lecture and there will be short reading quizzes that will be due before lecture.

Weekly Homework: There will be a short homework assignment almost every week, starting Week 2. The homework assignment will ask you to read and reflect on current environmental topics that are immediately relevant to the course material. Homework will be assigned at the beginning of the week and will be discussed in your discussion section that week. Your short writing assignments will be due in canvas by midnight on Fridays. There will be no homework assignment in Week 9.

Research Paper: This class will ask you to write a well-researched, carefully written paper on a strategy/project that could significantly reduce carbon emissions in the UC system and help us meet our carbon neutrality goal by 2025. Further information on the paper topic will be given in discussion section during Week 5 and will be posted in canvas. Important due dates on the paper topic are below.

Project assigned and ideas discussed (week 5)
Concept paper due (week 6)
First Draft due (week 7)
Second Draft due (week 8)
Final paper due May 28th

Academic Integrity Statement: Integrity of scholarship is essential for an academic community. 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. Academic misconduct will not be tolerated, and will result in disciplinary process. For more details on what constitutes cheating see here: <https://academicintegrity.ucsd.edu/excel-integrity/define-cheating/index.html>. In particular, students agree that by taking this course, all required written work and papers will be their own writing and sources will all be correctly references. Plagiarism will not be tolerated and all detections of plagiarism will be considered academic misconduct and subject to disciplinary process.

Grading: 10% Short reading quizzes
20% Weekly writing assignments
25% Research Paper
20% Midterm (April 23rd, online)
25% Final Exam

Extra Credit: There will likely be a number of opportunities to participate in remote seminars workshop and other activities throughout the quarter on topics that are relevant to our course. I will announce those opportunities, and have a short assignment available for extra credit.

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). We request that contact from the student and the OSD office be provided to the instructor in advance so that accommodations may be arranged.

Statement on Remote Learning. Keeping up with lecture material and assigned reading is a student’s obligation, as is the 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 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 BEFORE the due date, 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, ethnicity, class, sexual orientation, gender, gender identity or expression, religion, dis/ability, national origin, age, 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 and/or inequalities that impact you in or outside of class, please let us know. Your TAs and I want to be a resource for you, and we are happy to discuss possibilities for flexibility and accommodations to help you succeed in your academic goals.

I want to recognize that the academic fields of environmental science and sustainability **historically** focuses on a small subset of privileged voices, often even ignoring the vast knowledge of indigenous communities. In this class, we will make an effort to read scientific thought and listen to lectures from a diverse group of national and international environmentalists. I will also strive to center on curriculum on environmental issues that are pertinent to communities of color, such as increasing public access to open green space and disproportionate impacts of pollution and climate change impacts. In class, we will discuss issues of environmental injustice and we will deliberate the socioeconomic and racial inequalities in environmental impacts. Still, limits do exist. In this pursuit, I would also acknowledge that broadening participation in the academic field of environmental science is an on-going national priority. You are encouraged to contact me in person or electronically, or to 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>.