

Multi-Campus UC Course for Bending the Curve

*Upper-Division Undergraduate Level Course for Majors in
Engineering, Humanities, Math/Science, & Social Science*



Bending the Curve: Climate Change Solutions

University of California, San Diego

Winter 2020

Syllabus

Instructors:

Fonna Forman (Political Science)

V. Ram Ramanathan (Scripps Institution of Oceanography)

BENDING THE CURVE: CLIMATE CHANGE SOLUTIONS

SIO 109 / POLSCI 117

Winter 2020

The UC Climate Solutions Course at UC San Diego

Scripps Institution of Oceanography (SIO) and the Department of Political Science (PolSci)

Instructors:

Fonna Forman (PolSci): fonna@ucsd.edu

V. Ram Ramanathan (SIO): vramanathan@ucsd.edu

Office Hours:

Wed 2-3 Eckert

Monday 11-12, Nierenberg

Teaching Assistants:

Micah Farver mfarver@ucsd.edu

Osi Ajoku oajoku@ucsd.edu

Thursdays 2-3:30 SSB 345

Wednesdays 11am SIO

Class meets **Mondays and Wednesdays, 12:30 to 1:50 PM** in **ECKRT 227**.

Instruction begins: January 6, 2020; ends: March 11, 2020.

Final Project Presentations: March 9 & 11, 2020, during class

Final Project reports due: March 18, 10am.

Three group projects will be selected for archival in the California Digital Library.

Syllabus: Hybrid Structure

- This is a “flipped” course. Students are expected to review the video lectures, and read the associated readings, before coming to each class and arrive prepared to discuss topics and raise questions. The attached syllabus indicates the videos that will be discussed in each class.
- For grading protocols, see page 8-10.
- Please refer to the course overview document in the class website for a more complete description of goals, objectives and the hybrid nature of this multi-campus course offered simultaneously on many UC campuses.

Key:
■ quizzes
■ lab sessions

■ guest lectures
presentation days / due dates

		Schedule of Lectures and Lab Sessions
		Topics
Lecture	Cluster	PART I: SETTING THE STAGE: CLIMATE CHANGE DRIVERS & IMPACT
1 Jan 06	Science Solutions	Introduction to Course Structure: Ram and Forman Climate Change Science: Ram Video Lecture: Climate Change, V. Ramanathan
2 Jan 8	All Clusters	Bending the Curve Solutions: Ram Video Lecture: Six Clusters & Ten Solutions for Bending the Curve, V. Ramanathan Quiz: 20 mts [Climate Change Science; 6 Clusters and 10 Solutions]
3 Jan 13	Societal Transformation Solutions	Humans & Nature: How Did We Get Here? Forman Video Lectures: I. Climate Justice & Equitable Approaches, F. Forman (UCSD) II. The Quest for Climate Justice, D. Pellow (UCSB) <i>Last 30 mts: Final Projects Explained. After some preliminary research, students will rank and submit their project preferences. Rankings will be used to assign projects and groups.</i>
4 Jan 15	Science Solutions	Impacts and Barriers to Solutions: Ram Video Lecture: Obstacles to Climate Solutions, S. Davis (UCI) <i>Project preferences due.</i>
5 Jan 20		No class: MLK Day

PART II: LIVING LABORATORIES FOR BENDING THE CURVE: THE CALL TO ACTION

<p>6 Jan 22</p>	<p>Governance Solutions</p>	<p>Bending the Curve: California as a Living Laboratory: Forman (30 mts)</p> <p>Video Lecture: Lessons from California, D. Press (UCSC)</p> <p>Lab Session: Student groups will be announced</p> <p><i>Each group will meet in the classroom and discuss organization of the report and develop a strategy. Forman, Ram and the TAs will circulate among groups</i></p>
<p>7 Jan 27</p>	<p>All Clusters</p>	<p>Living Laboratories: Ram (50 mts)</p> <p>Video Lectures:</p> <ul style="list-style-type: none"> I. Carbon Neutrality Initiative of UC, M. St. Clair (UCOP) II. Energy Efficiency Management at UCI, J. Brower (UCI) <p>Lab Session</p>
<p style="text-align: center;">PART III: SOLUTIONS: CLIMATE MITIGATION & SOLUTIONS</p>		
<p>8 Jan 29</p>	<p>Science & Technology-Based Solutions</p>	<p>Science & Technology Pathways for Bending the Curve: Ram (50 mts)</p> <p>Video Lectures:</p> <ul style="list-style-type: none"> I. Energy Technology Pathways, S. Samuelsen (UCI) II. Transportation Pathways for BtC, D. Sperling (UCD) <p>Quiz: 20 mts [Energy and Transportation Pathways]</p>
<p>9 Feb 03</p>		<p>Lab Session: Entire Period</p> <p><i>(2-3 page group proposal due by midnight)</i></p>

10 Feb 05	Societal Transformation Solutions	<p>Social Change: Forman (50 mts)</p> <p>Video Lectures:</p> <ul style="list-style-type: none"> I. Changing Social Norms & Behavior, F. Forman (UCSD) II. Social Movements & Social Solutions to Climate Change, H. Han (UCSB) <p>Lab Session</p>
11 Feb 10	Societal Transformation Solutions	<p>Public Opinion & Communication: Forman (50 mts)</p> <p>Video Lectures:</p> <ul style="list-style-type: none"> I. Climate Science Communication, R. Somerville (UCSD) II. Climate Communication, J. Christensen (UCLA) <p>Lab Session</p>
12 Feb 12	Societal Transformation Solutions	<p>Climate Change & Public Health: Forman (40 mts)</p> <p>Video Lecture: Climate Change: Health Impacts, G. Solomon (UCSF)</p> <p>Climate Change & Religion: Forman (40 mts)</p> <p>Video Lectures:</p> <ul style="list-style-type: none"> I. Religion, Ethics and Climate Change, Tucker (Yale) II. Climate Change, Christianity and the Real Challenges, Hayhoe (Texas Tech) <p>Guest Lecture (Jyoti Mishra, UCSD Department of Psychiatry)</p>
13 Feb 17		<p>No class: Presidents Day</p>

<p>14 Feb 19</p>	<p>Governance Solutions</p> <p>Market & Regulations-Based Solutions</p>	<p>International Governance: Forman (30 mts)</p> <p>Video Lecture: International Governance, D. Victor (UCSD)</p> <p>Market Based Solutions: Forman (30 mts)</p> <p>Video Lectures:</p> <p>I. Economics / Designing Climate Policy, M. Auffhammer (UCB)</p> <p>II. Cost Effective & Efficient Climate Policies, M. Jacobsen (UCSD)</p> <p>Lab Session</p>
<p>15 Feb 24</p>		<p>Lab Session: Entire Period</p> <p>2-3 page written group progress report due by midnight</p>
<p>16 Feb 26</p>	<p>Technology-Based Solutions</p>	<p>New Technologies: Ram (50 mts)</p> <p>Video Lectures:</p> <p>I. Renewable Energy Samuelson (UCI)</p> <p>II. Nuclear Energy Peterson (UCB)</p> <p>Lab Session</p>
<p>17 Mar 2</p>	<p>Technology-Based Solutions</p>	<p>Fast Tracking Mitigation: Ram (50 mts)</p> <p>Video Lecture: Technologies for SLCPs Mitigation, Ramanathan (UCSD) & D. Zaelke (UCSB)</p> <p>Lab Session</p>
<p>18 Mar 4</p>	<p>Technology-Based Solutions</p>	<p>Removal of Carbon from the Atmosphere: Ram (50 mts)</p> <p>Video Lectures:</p> <p>I. Enhancing Carbon Sinks, W. Silver (UCB)</p> <p>II. Negative Emissions Technology R. Aines (LLNL)</p> <p>Lab Session</p>

19 Mar 9		<i>Final Project presentation</i>
20 Mar 11		<i>Final Project presentation</i>

For detailed outline of taped lectures, see the course overview document

Guidelines for Projects & Grading

There will be no sit-down midterms or final exam in this course. Student grades will be based on two things:

- 1) Class participation: Participation in open discussions during each session (10%), and performance on two 20-minute quizzes (15%) **total: 25%**
- 2) Group Project, which contains several components: a proposal, a progress report; a final in-class presentation; and a Final Group Report, and individual chapters within that report by each student. An example of the Final report is provided on the class website, and detailed discussion of Final Group Report structure can be found at the end of the syllabus, below. **75% (50% for group work including the executive summary; 25% for the individual report)**

Group Project Guidelines:

Students will work in interdisciplinary groups of 4-5 students each. During week 2, students will be asked to rank their preferences from the set of project options listed below. We will assemble teams based on these preferences & interdisciplinary distribution considerations.

Student groups will investigate a set of local / regional / state-wide climate solutions, with a focus on one of the following topics:

1. Starting a **youth movement** committed to climate action.
2. Addressing the **public health impacts** of climate change, with an emphasis on **air quality**. An investigation of cross-border air quality dynamics would be a welcome dimension of the project.
3. Designing a **social media / communications** strategy / campaign for skeptical demographics. An investigation of the role of religion would be a welcome dimension of the project.
4. **Protecting disadvantaged California populations** disproportionately vulnerable to heat waves, fires, and the health impacts of climate disruption.
5. California adaptation strategies – **sea-level rise and flooding**
6. California adaptation strategies – **fires**
7. California adaptation strategies - **precipitation whiplash**
8. California adaptation strategies – **heat waves**
9. **Feeding San Diego:** Addressing food waste in San Diego while addressing food disparities
10. **UC Carbon Neutrality Initiative:** The University of California's plan to be carbon neutral by 2025.

A critical analysis of what they have accomplished so far; the challenges and gaps they face in meeting the goals. What solutions do you have for the University of California to meet its goals and fill the gaps?

11. **City of San Diego Climate Action Plan:** A critical analysis of what they have accomplished so far; the challenges and gaps they face in meeting the goals. What solutions do you have for San Diego to meet its goals and fill the gaps. How did the republican Mayor take the bold step of taking Climate actions against his Party's stand on climate mitigation?

Topics and Issues to Consider in the Project (not ranked or prioritized):

- Does your case have a “Climate Action Plan” in place?
- How does your case map onto the six clusters and 10 solutions? Which curves does it bend?
- How does it convince people of the legitimacy of climate change science; the need for actions? How does it convey a sense of urgency?
- How does it motivate people to take action?
- Technologies deployed and barriers: Off-the shelf versus new technologies; How will you improve it?
- Are the solutions you propose scalable? How? If not, why not?
- Short Lived Climate Pollutants: Marrying local interests with global policies: Methane Recovery from landfills/food wastes/farm manure; Same for HFCs.
- Role of Behavioral Changes; Market Mechanisms; Corporate Support
- How fast can it be done given the constraints of public and political support?
- What governance practices are being deployed?

Timeline

Proposal Due, week 5 (Feb 3): The team proposal will detail the specific case study, focusing on understanding what is currently being done, going over CAPs, looking at any progress towards goals since they were announced etc. and a work plan for the project over the course of the quarter. Proposals will be presented to the entire class on Feb 7, and submitted as a written 2-3 page group report that evening by midnight, on TED Turnitin.

Progress Report, week 8 (Feb 24): Groups will provide a written update of their progress to date. Submitted as a written 2-3 page group report by midnight, on TED Turnitin.

Final Presentation, week 10 (March 9 & 11): Group presentation to the entire class

Final Materials Due (March 18, 10am): Group executive summary and individual project reports are due.

Final Group Report

For a model, please see the attached group project on Stockholm

Final Group Report Structure

1. Title Page: Should list all authors in alphabetical order; it should show under each name the section title (individual report) of each.

2. Executive Summary: 5 pages - written collaboratively by all members of the group

- Your case study's history of addressing climate change and future goals
- What has been successful so far
- How the six clusters and ten solutions relate to what is being done
- Areas for improvement and solutions not utilized
- A plan for improvement moving forward

3. Introduction: 2-3 pages written collaboratively by all members of the group

4: Individual Papers (Chapters) - in depth investigation of one of the themes or examples covered in the Executive Summary.

Chapter 1 (Author 1) 7 pages by author 1

Chapter 2 (Author 2) 7 pages by author 2

.....

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etc....

NOTE: The executive summary is the integrated whole of the individual sections where the whole is much greater than the sum.

BENDING THE CURVE

EXECUTIVE SUMMARY

Ten scalable solutions for carbon
neutrality and climate stability

Ramanathan et al, 2015:

[Executive Summary of the Report, *Bending the Curve: 10 scalable solutions for carbon neutrality and climate stability.*](https://uccarbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf)

Published by the University of California, October 27, 2015

https://uccarbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf



Carbon Neutrality Initiative

Berkeley
UNIVERSITY OF CALIFORNIA

UC DAVIS
UNIVERSITY OF CALIFORNIA

UC Irvine
UNIVERSITY OF CALIFORNIA, IRVINE

UCLA

UNIVERSITY OF CALIFORNIA
UC MERCED

UNIVERSITY of CALIFORNIA
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UCSF
University of California
San Francisco

UC San Diego

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UNIVERSITY OF CALIFORNIA
SANTA BARBARA

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SANTA CRUZ

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