

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

January 8, 2019

**Syllabus, hybrid style of teaching
and grading procedures**

Instructors:

Fonna Forman (Political Science)

V. Ram Ramanathan (Scripps Institution of Oceanography)

BENDING THE CURVE: CLIMATE CHANGE SOLUTIONS

SIO 109 / POLSCI 117

Winter 2019 (Jan 8th to March 14th)

The UC Climate Solutions Course at UC San Diego

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

Instructors:

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Office Hours:

TBC

TBC

Teaching Assistants:

Leah Werner: lewerner@ucsd.edu

Julia Park: jup090@ucsd.edu

Class meets **Tuesdays and Thursdays, 09:30 AM to 10:50 AM** in **ECKRT 227**.

Instruction begins: January 08, 2019; ends: March 14, 2019.

Final Project Presentations to Instructors and TAs: March 12 & 14, 2018, during class

Final Project reports due: March 19, 10am.

Three group projects will be selected for archival in the California Digital Library. These projects will be announced through email at 10 AM on March 22nd.

Syllabus: Hybrid Structure

- This is a “flipped” course. Students are expected to review the video lectures 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 7-8.
- 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 in many UC campuses.

Key:

■ quizzes
 ■ lab sessions

■ guest lectures
presentation days

		Schedule of Lectures and Lab Sessions
		Topics
Lecture	Cluster	PART I: SETTING THE STAGE: CLIMATE CHANGE DRIVERS & IMPACT
1 Jan 08	Science Solutions	<p><u>In-Class Discussion Topics:</u> Introduction to Course Structure: Ram and Forman (30 mts) Climate Change Science: Ram (50 mts) Video Lectures: Course Overview and Vision & Climate Change, V. Ramanathan</p> <p><i>For all lectures, students are expected to view the video lecture(s) before coming to the class and be prepared to discuss it in class.</i></p>
2 Jan 10	All Clusters	<p>Bending the Curve Solutions: Ram (60 mts) Video Lecture: Six Clusters & Ten Solutions for Bending the Curve, V. Ramanathan</p> <p>Quiz: 20 mts [Climate Change Science; 6 Clusters and 10 Solutions]</p>
3 Jan 15	Science Solutions	<p>Impacts and Barriers to Solutions: Ram and Zaelke (40 mts) Video Lectures: I. Obstacles to Climate Solutions, S. Davis (UCI)</p>
4 Jan 17	Societal Transformation Solutions	<p>Humans & Nature: How Did We Get Here? Forman (40 mts.) Video Lectures: I. Climate Justice & Equitable Approaches, F. Forman (UCSD) II. The Quest for Climate Justice, D. Pellow (UCSB)</p> <p><i>Last 40 mts: Present and Explain Final Projects to Students. Students rank their projects. These rankings will be used to assign projects and groups; will be overseen by TAs: Leah Werner and Julia Park</i></p>
		PART II: LIVING LABORATORIES FOR BENDING THE CURVE: THE CALL TO ACTION
5 Jan 22	Governance Solutions	<p>Bending the Curve Living Laboratory: Forman (30 mts) Video Lecture: Lessons from California, D. Press (UCSC)</p> <p>Lab Session (50 mts): Student groups will be announced: Leah Werner and Julia Park. <i>Each group will meet in the classroom and discuss organization of the report and develop a strategy. Forman and Ram and the two TAs will circulate among groups</i></p>

6 Jan 24	All Clusters	<p>Living Laboratories: Ram (50 mts)</p> <p>Video Lectures:</p> <p>I. Carbon Neutrality Initiative of UC, M. St. Clair (UCOP)</p> <p>II. Energy Efficiency Management at UCI, J. Brower (UCI)</p> <p>Quiz: 20 mts [Impacts and Barriers; Energy and Transportation Pathways]</p>
PART III: SOLUTIONS: CLIMATE MITIGATION & SOLUTIONS		
7 Jan 29	Science & Technology-Based Solutions	<p>Science & Technology Pathways for Bending the Curve: Ram (60 mts)</p> <p>Video Lectures:</p> <p>I. Energy Technology Pathways, S. Samuelson (UCI)</p> <p>II. Transportation Pathways for BtC, D. Sperling (UCD)</p> <p>Lab Session (20 mts)</p>
8 Jan 31		Lab Session: Entire Period
9 Feb 05	Market- & Regulations-Based Solutions	<p>Market Based Solutions: Forman (50 mts)</p> <p>Video Lectures:</p> <p>I. Consideration of Economics for Designing Climate Policy, M. Auffhammer (UCB)</p> <p>II. Cost Effective & Efficient Climate Policies, M. Jacobsen (UCSD)</p> <p>Lab Session (30 mts)</p>
10 Feb 07		<p>Presentations: Student teams make brief presentation of their proposals, including the challenges they face.</p> <p>(2-3 page group proposal due by midnight on TED Turnitin)</p>
11 Feb 12	Societal Transformation Solutions	<p>Social Change: Forman (50 mts)</p> <p>Video Lectures:</p> <p>I. Changing Social Norms & Behavior, F. Forman (UCSD)</p> <p>II. Social Movements & Social Solutions to Climate Change, H. Han (UCSB)</p> <p>Lab Session (30 mts)</p>
12 Feb 14	Societal Transformation Solutions	<p>Public Opinion & Communication: Forman (50 mts)</p> <p>Video Lectures:</p> <p>I. Climate Science Communication, R. Somerville (UCSD)</p> <p>II. Climate Communication, J. Christensen (UCLA)</p> <p>Guest Lecture: Nan Renner, Scripps Birch Aquarium</p> <p>Lab Session (30 mts)</p>

13 Feb 19	Societal Transformation Solutions Governance Solutions	Climate Change & Public Health: Forman Video Lecture: Climate Change: Health Impacts, G. Solomon (UCSF) <i>Guest Lecture (30 mts): Wael Al-Delaimy, UCSD Institute for Public Health</i> International Governance: Ram (40 mts) Video Lecture: International Governance, D. Victor (UCSD)
14 Feb 21		<i>Lab Session: Entire Period</i>
15 Feb 26	Technology Based Solutions	Bending the Curve with Sustainable Transportation: Ram (50 mts) Video Lecture: Energy Implications of Transportation, M. Barth (UCR) <i>Lab Session (30 mts)</i> <i>2-3 page written group progress report due by midnight on TED Turnitin</i>
16 Feb 28	Technology Based Solutions	Fast Tracking Mitigation: Ram (50 mts) Video Lecture: Technologies for SLCPs Mitigation, Ramanathan (UCSD) & D. Zaelke (UCSB) Fossil Fuel class debate (30 minutes)
17 March 5	Technology Based Solutions	Removal of Carbon from the Atmosphere: Ram (40 mts) Video Lecture: Enhancing Carbon Sinks, W. Silver (UCB) <i>Lab Session (40 mts)</i>
17 March 7		Bending the Curve: Open Discussion and Wrap-up <i>Lab Session (30 minutes)</i>
18 March 12		<i>Final Project presentation</i>
19 March 14		<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, and performance on three 20 minute quizzes. **30%**
- 2) Group project which contains several components: a proposal, an oral progress report; a final in-class presentation; and a Final Group Report (consisting of a group executive summary (5 pages); followed by the body of the report which will include an introduction (3 pages), and a set of individual project reports, one for each member of the group – 7 pages each). Individual project reports comprise the body, or sections, of the Final Group Report. 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. **70% (50% for group work including the executive summary; 20% for the individual report)**

Project Guidelines:

Students will work in interdisciplinary groups of 4-5 students each. During week 2, each student will be asked to rank his or her preferences from a set of project options. Course instructors will assemble teams, based on preferences & interdisciplinary distribution considerations.

Student groups can pursue one of the following two project options:

- 1) *Investigate a Living Laboratory of Climate Solutions* (students are also welcome to propose their own, and to convince a group of classmates to join them).

-City of San Diego's 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?

-UCSD's Microgrid: What have they accomplished so far? How close to carbon neutral are they? How did a university manage to do this on its own? What are the challenges and gaps they face in meeting carbon neutrality? What are the lessons learned and are these applicable to other similar jurisdictions?

-EarthLab, a collaboration between UCSD, the San Diego Unified School District and Groundwork San Diego, an environmental justice non-profit based in the Southeast San Diego neighborhood of Encanto. What is the vision of EarthLab and how will it advance this vision into the future? How did the EarthLab come into being? Explore the physical as well as the programmatic dimensions of the project. How did the partners come together? What are the current challenges of the EarthLab? How is it funded? What are the lessons for other universities seeking to partner with local communities to increase public knowledge, and

instigate collective action? Students involved in this case study will work closely with EarthLab leadership.

-Birch Aquarium at Scripps is the public exploration center for the Scripps Institution of Oceanography at UCSD. With nearly half a million visitors each year, they are positioned to have a huge impact on public knowledge. They have just committed to a new mission-impact initiative called Climate Science / Climate Action. They are eager to connect this mission with Bending the Curve thinking. How did the institution arrive at this new mission, and what are their plans to advance it? How can Bending the Curve be helpful to them? What are some helpful contrasting case studies, perhaps more advanced in their vision and strategy, that can help them during this exploratory phase? Students involved in this case study will work closely with Birch leadership, and their report will become a part of the visioning process at the aquarium.

-San Diego County's Climate Action Plan: In December 2018, a California Superior court rejected the County's Climate Action plan, approved in February 2018, after years of litigation filed successfully by environmental groups arguing that it does not provide adequate details on how the county would achieve its state-mandated GHG emissions reduction goals. Why is there so much conflict over climate action in San Diego County? What are the interests in conflict? Be specific. How has the County Board of Supervisors navigated them? Analyze the plan, the history of court filings and court decisions. Where do things stand now? What solutions do you have for the county to meet its goals?

2) *Investigate a set of local climate solutions, with a focus on one of the following topics:*

- Eliminating **food waste** on the UCSD campus and its effect on mitigating UCSDs emissions
- Reducing emissions at UCSD from the **transportation** sector
- Starting a **student movement** at UCSD committed to Climate Action
- Divestment** from fossil fuel companies in UC's retirement plans
- Integrating **climate education** more centrally into the UCSD undergraduate curriculum.

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

You do not need to consider all of the topics and issues listed below; a subset of at least three is mandatory.

If you think other issues or topics are relevant, you can bring them up.

- Does your case have a "Climate Action Plan" in place?
- How does your case fit or 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 they 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 employed 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, fifth week (Feb 7): 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, eighth week (Feb 26): 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, tenth week (March 12 & 14): Group presentation to the entire class

Final Materials Due, exam week (March 19): Group executive summary and individual project reports are due.

Structure of the Final Group Report

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

Executive Summary Pages 1-5 written by all members of the group

Introduction Pages 6-8 written by all members of the group

Section 1 (Author: xxx) Page 9 to 15 (7 pages)

Section 2 (Author: yyy) etc.

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.....

Section 5 (Author: zzz)

Executive Summaries Should Address:

- 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

Individual Papers Should Explore: in depth one of the themes or examples covered in the Executive Summary. Grade for individual papers is not part of the 50% group work grade.

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

Executive Summary of the Report, *Bending the Curve: 10 scalable solutions for carbon neutrality and climate stability.*

Published by the University of California, October 27, 2015

[https:// uccarbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf](https://uccarbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf)



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