COURSE SYLLABUS

Climate Change in Four Dimensions: Scientific, Policy, International, and Social

Start Date: January 7th, 2014 (ten weeks long)
End Date: March 18th, 2014

Instructor Information

Professors
Charles Kennel, Ph.D.
Naomi Oreskes, Ph.D.
Veerabhadran Ramanathan, Ph.D.
Richard Somerville, Ph.D.
David Victor, Ph.D.
Instructor of Record
Kim McIntyre
Course Facilitators
Ilse Ortabasi, Ph.D.
Rhea Stewart, M.A.

*Please visit the course Introduction section to learn more about the professors, instructor and course facilitators.

Communication Policy: Since this course is a massive open online course (MOOC), we will not be able to respond to each individual question. However, you may be able to get your questions answered in the following ways:

1. Check the Frequently Asked Questions (FAQ link in the left hand navigation within the course)
2. Post your question in the Discussion Forum
3. Participate in the Weekly Bridge Session or watch the recorded version
4. Ask your classmates for their input

The instructor of record and course facilitators will be participating in the Discussion Forum, the weekly Bridge Sessions and will be adding content to the FAQ area based on the questions asked during the quarter.

Welcome

Welcome to this massive online open course -- MOOC!
We're excited to be teaching this online open course and we are glad that you have joined us.

This course views climate change from a variety of perspectives at the intersection of the natural sciences, technology, and the social sciences and humanities. You will be introduced to new topics now confronting the science and policy communities, such as geoengineering. Throughout this course we will be addressing some of the big questions that dominate public views of climate change, such as:

- How strong is the scientific basis?
- What is the range of possible policy responses?
- Why are there such different views on the causes and consequences of climate change? Why do some accept the evidence and other resist it?
- What is the role of experts in framing the issues and making policy?
- Why has the world so far failed to address this issue effectively?
- What can we do to reduce the rate of climate change?
- What can countries and regions do to adapt to climate change?
- Can governments actually identify and solve complex problems of this type?

We anticipate that some of you may decide to pursue a career in one of the dimensions of climate change; our hope is that this course will prepare you to evaluate ideas associated with climate change and continue your studies in an area aligned with your interest and passion.

Course Structure

While subject matter will be communicated primarily through Web-based materials, subject matter will be enhanced through supplemental reading materials and periodic learning activities and quizzes. The course is 10 weeks long and is designed for you to engage with other students around the learning objectives outlined for that week. Each Tuesday the new week of content will be released.

We suggest that you:

1) Log in on Tuesdays and review the learning objectives, the activity and the discussion questions for the week.
2) Then complete the readings and lecture by Friday and post to the discussion forum.
3) Over the weekend, read and respond to at least two other discussion posts (Engaging with other students in discussion about what you are learning will enhance your learning experience) and complete your activity.
4) Monday participate in the Bridge Session or watch the recorded version and then complete the quiz for the week.

The course is designed for you to move through the content with your classmates in weekly chunks. Using social media for the weekly activities, we hope that you will build relationships with other students that will last beyond this course. By comparing and contrasting what is working and not working in your communities you will have the opportunity to gain insights into other regions of the world.

Course Materials/Textbooks

Required and optional readings are posted with each lesson. The readings are aligned with the weekly lesson learning objectives. Open Educational Resources are used in this course. There is no required textbook.

Course Prerequisites

The course is designed for graduate or qualified senior undergraduate students, and will be taught in an online lecture format. There are no specific background requirements and everyone is welcome to participate; although, it will be helpful to you if you have experience in interpreting data as well as graphic representations of data.

Course Goal

Upon completion of this course, you will have gained a fundamental knowledge of the topics confronting the science and policy communities related to climate change.

Course Overview and Learning Objectives

This course has 19 **lessons**, 1 guest lecture, 8 weekly **quizzes**, weekly required **activities**, a **midterm exam**, and a **final exam**.

***Weekly Required Activities** Detailed instructions are posted with each week's lessons. Work your way through the content. Share your findings and insights with your classmates using social media tools, such as Facebook, Twitter or LinkedIn. Conclude the activity by writing a short reflection for the week's activity.

Lessons	Course Learning Objectives By the end of the course you will be able to:	Due
Class Start: January 7th, Week 1: Basic Science of Climate Change ***Professor Somerville***		
Introduction	• Navigate the course. • Locate where your peers live. • Test your prior knowledge of the topics discussed. • Set up your preferred social media accounts.	Complete Getting to Know You questionnaire View Course Tour Add name and location to the class world map Complete Test Your Knowledge (ungraded) Set up social media accounts View Syllabus Complete Checklist
Lesson 1: Climate Change Science: History, Foundations, Detection, Attribution	• Explain the early history of climate change from the physical science point of view. • Describe the foundation of physical climate change science. • Explain the differences between detection and attribution in climate science.	By January 13, 2014 Required Readings: IPCC, 2007: Summary for Policymakers; The Forgiving Air, Chapter 4; Recent Climate Observations Compared to Projections Required Activity: What's your carbon footprint? Weekly Quiz
Lesson 2: How Much Will Climate Change? Climate Models and Sensitivity	• Explain the historical background, basics and purposes of climate change models. • Observe patterns in projected changes in temperature, sea level. • Identify different scenarios in various models.	

January 14th, Week 2: The Nature of Scientific Knowledge ***Professor Oreskes***		
Lesson 3: The Scientific Consensus on Climate Change: How Do We Know We're Not Wrong? Part 1	• Describe the role of the IPCC. • List and analyze the claims challenging climate science. • Discuss what is meant by scientific consensus. • Explain basic scientific methods and their fallibility. • Describe processes that contribute to the reliability of scientific knowledge. • Describe five main candidates for scientific methods and standards.	By January 20, 2014 Required Readings: The Scientific Consensus on Climate Change: How Do We Know We're Not Wrong? Required Activity: What is meant by scientific consensus? Weekly Quiz
Lesson 4: The Scientific Consensus on Climate Change: How Do We Know We're Not Wrong? Part 2	• Describe five main candidates for scientific methods and standards. • Apply the deductive model of science to climate change. • Apply the inductive model of science to climate change.	
January 21st, Week 3: Climate Change Mitigation ***Professors Somerville and Victor***		
Lesson 5: Physics and chemistry of climate mitigation	• Describe the scientific background that underlies climate policy. • Summarize the scientific updates since IPCC4, as found in the Copenhagen Diagnosis.	By January 27, 2014 Required Readings: If I Were President: A Climate Change Speech; The Copenhagen Diagnosis; Climate change, irreversibility, and urgency; United Nations Framework Convention on Climate Change Required Activity: The Climate Bathtub Simulation? Weekly Quiz
Lesson 6: Why Climate is an International Problem	• Describe why both mitigation and adaptation of climate is an international problem. • List and understand the components of an international treaty. • Analyze international strategies on climate change.	

January 28th, Week 4: International dimensions of climate change ***Professor Victor***		
Lesson 7: International Cooperation on the Ozone Layer: A Useful Model?	• Explain when international cooperation has been successful and when it has failed in other areas than cooperation on climate change. • Describe lessons that can be learned from the experience of successful international cooperation for cooperation on climate change. • Analyze the Montreal Protocol as a model for climate change and explain why we had success with the ozone layer.	By February 3, 2014 Required Readings: Protecting the Ozone Layer; The Kyoto Protocol; The Montreal Protocol; Global Warming Gridlock: New Strategies for Protecting the Planet; The Copenhagen Accord; Durban Platform Required Activity: Climate Change Policy Decisions in your Country Weekly Quiz
Lesson 8: International Cooperation on Climate Change: Models for Reform (with a Focus on Mitigation)	• Describe why we have made such little progress on the climate problem. • List different visions/strategies there are to address mitigation of climate change. • Answer which strategies might work better.	
February 4th, Week 5: The Impacts of Climate Change ***Professors Somerville and Kennel***		
Lesson 9: Extreme Weather, Climate Change and Communication	• List ways to communicate anthropogenic climate change science to lay audiences. • Describe the connection between extreme weather and climate change.	By February 10, 2014 Required Readings: Communicating the Science of Climate Change; Medical Metaphors for Climate Issues: An editorial essay; IPCC, 2007: Summary for Policymakers Required Activity: Six Americas Climate Change Survey Weekly Quiz
Lesson 10: Impacts of Climate Change	• Describe the effects of regional weather patterns, water availability, floods, drought, and wildfires. • List the impacts of climate change on agriculture, ecology, human disease, regional technical systems.	
February 11th, Week 6: What may be in store for the world? ***Professor Kennel***		
Midterm Exam		
Lesson 11: Coping with Climate Change in the Next Half-Century	• List the reasons why we should expect a 2 degree Celsius warming as early as 2050, and therefore why we must prepare now to adapt.	By February 17, 2014 Required Readings: California's Energy Future; Coping with Climate Change in the Next Half-Century Required Activity: The Intergovernmental Panel on Climate Change (IPCC)

February 18th, Week 7: How the public views climate change ***Professor Oreskes***		
Lesson 12: Merchants of Doubt, Part 1	• List scientific criteria that support climate science conclusions. • Analyze and discuss the evidence for climate change. • Summarize the history of awareness and knowledge about anthropogenic climate change. • List reasons why so many people reject the science of climate change. • Analyze doubt-mongering political strategies of climate change deniers.	By February 24, 2014 Required Readings: Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming Required Activity: Trusted Communicator Weekly Quiz
Lesson 13: Merchants of Doubt, Part 2	• Discuss the strategies used to confuse people about the scientific evidence of climate change. • Examine why the scientific evidence has not had more traction. • Describe and analyze the political and social obstacles to acceptance of climate change.	
February 25th, Week 8: How regions are preparing to adapt ***Professor Kennel***		
Lesson 14: Ice, Snow, and Water	• Describe and analyze the complex issues of melting mountain snows and glaciers, their contributions to sea level rise, and their impacts on rivers and water availability. • Answer the questions: Who will be affected by sea level rise, and by how much?	By March 3, 2014 Required Readings: Planning for the impacts of sea level rise; Sea-level rise and its possible impacts given a 'beyond 4°C world' in the twenty-first century; A Summary Report from the California Climate Change Center; Linking climate change science with policy in California; A Summary Report on the Third Assessment from the California Climate Change Center; Summary and Synthesis of the ACIA Required Activity: A Sustainable Future Weekly Quiz
Lesson 15: Arctic and California Climate Change Assessments	• List and describe the impacts of climate change on the Arctic, both present and projected. • List and describe the impacts of climate change on the State of California, USA. • Describe California's climate change legislation and impact assessments.	

March 4th, Week 9: What we can do, Part 1 ***Professor Victor***		
Lesson 16: What if climate change turns ugly? The Pros and Cons of Geoengineering	• Define what geoengineering is. • Describe the different types of geoengineering, with examples for each. • Identify the key governance issues surrounding climate engineering.	By March 10, 2014 Required Readings: The Geoengineering Option; Report to the President on Accelerating the Pace of Change in Energy Technologies Through an Integrated Federal Energy Policy Required Activity: Geoengineering Weekly Quiz
Lesson 17: Technology Innovation (With a Focus on Energy)	• List and describe the key issues in dealing with challenges to technological innovation. • Identify the elements of each fundamental of technological innovation. • Compare and contrast the role of different nations in technological innovation.	
Last Week Starts March 11th, Week 10: What we can do, Part 2 ***Professors Oreskes, Kennel, and Ramanathan***		
Lesson 18: It's Not Too Late to Mitigate	• Describe the difference between adaptation, mitigation and geo-engineering. • List and analyze the major components of the Lovins study "Reinventing Fire."	By March 17, 2014 Required Readings: Climate Change: Think Globally, Assess Regionally, Act Locally Required Activity: Mitigation
Lesson 19: Avoid the Unmanageable, Manage the Unavoidable	• Describe the essential role of assessment in the adaptive management of complex systems. • Analyze the critical role of local communities. • Describe the complexity of knowledge assembly for regional and local decision-support. • Describe the need for assessments to encourage timely decisions. • Define and give examples of "Knowledge Action Networks."	
Guest Lesson by Professor Ramanathan	• Sustainability of the Bottom 3 Billion in the Context of Climate Change and SLCPs Mitigation	
Final Exam		

Online Course Structure

The course is organized using this course menu. These links are located on the left side of your screen.

Link Name	What is found there?
Announcements	This is the first page you see upon entering this course. Your instructors will post announcements and reminders here.
Introduction	Contains an introduction to the course and instructor biographies.
Syllabus	Contains the course outline, learning objectives, weekly assignments and course details.
Lessons	This section is where to find the weekly lessons. Each lesson consists of: 1. The recorded video lectures. *The lectures are self-paced and can be replayed like a video movie (start, pause, rewind, etc). All lectures are close-captioned.* 2. A transcript and visual slide are provided in PDF. 3. Check Your Knowledge (ungraded quiz) 4. The required readings, additional resources, and the required activity. 5. The quiz for that week.
Ask the Professor	Contains content questions about scientific, policy, international, and social questions pertaining to climate change. If you can't find your question, please submit it in the Discussion Forums.
Discussion Forums	Weekly topic questions are posted here to foster active text-based discussion between you and your classmates. You may also use the Discussion Forums to locate other students to work on projects together, and arrange online meetings to share your ideas.
FAQ	Frequently Asked Questions that are not content specific.

Grading Policy

The final grade will be the sum of grades achieved in the following areas:

Assessment	Description	% of Grade
Eight quizzes (weeks 1,2,3,4,5,7,8,9) There is no quiz in weeks 6 and 10, due to the midterm and final test.	10 multiple choice questions	**30**
Ten activities (1 each week)	Write a short reflection on the activity (5 points each)	**20**
A midterm exam (week 6)	25 multiple choice questions	**20**
A final exam (week 10)	25 multiple choice questions	**30**
Total		**100%**

No late assignments or quizzes are accepted.

Grades are based on the percent of points earned. Letter grades are given as follows:

A+	97-100
A	94-96
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D+	67-69
D	65-66
F	0-64

"Check Your Knowledge" Questions

At the end of each lesson there is a non-graded "Check Your Knowledge" quiz based directly on the accompanying lesson video lectures. This is to help you focus on the key concepts introduced during those lectures, and may also assist in answering the graded weekly quiz questions. You may answer the "Check Your Knowledge" questions as many times as you like. This score is not part of your grade.

Please do not post quiz questions and answers on the discussion forum prior to the deadlines. There is no value in artificially boosting your score or anyone else's score by not fully participating in the learning experience.

How to Be a Successful Online Student

Discover some habits you can cultivate to boost your success when taking online college courses:

http://www.ou.edu/cls/online/success.htm
http://www.straighterline.com/blog/seven-habits-of-great-online-college-students/

Support

If you need any help with the course's content, with technical issues, or with course administrative needs, visit the areas "Ask the Professor", FAQ, Discussion Forums, the weekly Bridge Session (under lesson) and Help all found in the course menu or email: unex-mooc@ucsd.edu

Code of Conduct and Academic Honesty Policy

All participants in a course at UC San Diego Extension are bound by the University of California Code of Conduct, found at http://www.ucop.edu/ucophome/coordrev/ucpolicies/aos/uc100.html

The University is an institution of learning, research, and scholarship predicated on the existence of an environment of honesty and integrity. As members of the academic community, faculty, students, and administrative officials share responsibility for maintaining this environment. It is essential that all members of the academic community subscribe to the ideal of academic honesty and integrity and accept individual responsibility for their work. Academic dishonesty is unacceptable and will not be tolerated at the University of California. Cheating, forgery, dishonest conduct, plagiarism, and collusion in dishonest activities erode the University's educational, research, and social roles.

If students who knowingly or intentionally conduct or help another student perform dishonest conduct, acts of cheating, or plagiarism will be subject to disciplinary action at the discretion of UC San Diego Extension.