UNIVERSIDAD esan

Course syllabus
Climate Change

August – December 2018

Sixth Semester

Instructor

Gustavo Valdivia

I. General course information

Course	: Climate Change	Code	: 12279
Requirements	: 100 Approved credits	Semester	: 2018-II
Credits	: 3	Term	: Elective
Hours	: 3 hours per week (1 field trip: 12 horas)		

II. Course summary

Earth has a complex, interconnected system of processes that control the state of the climate. This course explores the science of climate change, perhaps the defining environmental issue of the 21st century. Students will learn how the climate system works; what factors cause climate to change across different time scales and how those factors interact; how climate has changed in the past; how scientists use models, observations and theory to make predictions about future climate; and the possible consequences of climate change for our planet. Finally, the course looks at the connection between human activity and the current warming trend and considers some of the potential social, economic and environmental consequences of climate change. We will examine these climate impacts and willalso focus our attention on what can be done to help us successfully meet these challenges.

III. Course goals

Evaluate the complexity of climate change as a problem by uniting science, impacts, economics, mitigation technologies and policy solutions.

IV. Learning outcomes

Students who successfully complete this course would be able to:

- Understand fundamental physical processes underlying climate variability and climate change
- Critically read and discuss academic articles on climate change, recognizing the importance of different discourses and approaches;
- Explain and evaluate the evidence for human-caused climate change, in the context of historical climate change, as well as the relevant scientific uncertainties;
- Explain the impacts of climate change on human well-being and the natural world, and evaluate means by which these impacts can be reduced (adaptation).
- Understand the social dimensions of climate change from multiple perspectives;
- Critically evaluate and use visual media and other communication strategies to engage people on climate change.

V. Methods

Classes will include lectures, readings, in-class projects, presentations, film screenings, and a group project. The textbook chapters, articles, reports, websites, and videos that you will read and watch during the quarter are your key sources of information about climate science and policy. Come to class having completed the readings.

The class will visit the Atarjea water plant in Lima to get a closer view of how a central facility for the city of Lima is being affected by climate change and how they are adapting to the future climate. Homework assignments and readings are designed to reinforce the course material and/or to introduce additional concepts and related issues.

VI. Assessment

Your final grade will be the weighted average of 4 different elements: a) Permanent evaluation (50%); b) Midterm exam (20%); and c) Final exam (30%).

Permanent evaluation grade is obtained as described in the following table:

PERMANENT EVALUATION 50%			
Type of evaluation	**Description**	**Weighting factor %**	
Discussion facilitation	Each student will be assigned with a partner to introduce the readings at least two times during the semester. These presentations should not last more than 10 minutes to introduce thoughtful reactions to the week's material and take us to some specific topic appropriate for class discussion.	15	15
In class assignments	Students will complete four in class assignments which will consist on discussing peer reviewed articles. These assignments are designed to offer reflection, additional in-depth study, interesting case studies, data analysis/collection, applications, relevant connections, or context for our in-class discussions.	40	
Creative/Artistic Project	Students will articulate through writing, video, photography, or other media a recent peer reviewed scientific paper that focus on a particular area of climate impact of your choice. More details on this assignment will be presented in class.	30	

The final grade (FG) is obtained using the following formula:

$$\mathbf{FG} = (0{,}50 \times PE) + (0{,}20 \times ME) + (0{,}30 \times FE)$$

where:

FG = Final Grade
MT = Mid Term Exam
PE = Permanent Evaluation
FE = FE

VII. Contents

WEEK	***CONTENTS***	***ACTIVITIES / ASSESMENT***
LEARNING UNIT I: The Science of Climate Change ***LEARNING OUTCOMES:***		
1° *Aug 20th – 25th*	Introduction: What do you know and what do you want to know about climate change? What makes climate change a new type of environmental problem?	Course presentation. Course policies and class presentations distribution. Climate Change, A Very Short Introduction (1-11). What We Know About Climate Change (1-11)
2° *Aug 27nd – Sep 1st*	Overview of climate science Earth's climate system today I: Earth's energy budget	Ruddiman, Chapter 1
3° *Sep 3rd* – 8th	Earth's climate system today II: Greenhouse effect	Ruddiman, Chapter 2 **In class assignment #1**
4° *Sep 10th* – 15th	Earth's climate system today III: Heat transformation	Ruddiman, Chapter 2 Archer and Rahmstorf, Chapter 2
5° *Sep 17th* – 22nd	The history of climate: What Can We Learn from the Past?	Ruddiman, Chapter 3
6° *Sep 24th* – 29th	Climate modelling: Global atmospheric circulation Future climate: Scenarios and projections	Houghton, Chapter 5 **In class assignment # 2**
7° Oct 1st – 6th	**CLASS MIDTERM EXAM**	
8° Oct 8th – 13th	**MIDTERM EXAMS**	
LEARNING UNIT II: Looking Ahead –Potential Consequences, Risks, Uncertainties, and solutions of Climate Change ***LEARNING OUTCOMES:***		

9° Oct 15th – 20th	Impacts of climate change	Archer and Rahmstorf, Chapter 8 IPCC Report 2014: "Summary for Policy Makers" and "Central and South America.
10° Oct 22nd – 27th	Impacts of climate change	**Film Screening: *Before the Flood* film screening**
11° Oct 29th – Nov 3rd	Impacts of climate change	Field visit: Atarjea water plant
12° Nov 5th – 10th	Mitigation and Adaptation	Dessler and. Parson, Chapter 3 Archer and Rahmstorf, Chapter 9 **In class assignment #3**
13° Nov 12th – 17th	Climate policy options under uncertainty: International Agreements: The future of adaptation and mitigation: Beyond the Paris Climate Agreement	Gupta, J. (2010). "A History of International Climate Policy." Wiley Interdisciplinary Reviews: Climate Change 1(5): 636-653. Clemencon, "The Two Sides of the Paris Climate Agreement: Dismal Failure or Historic Breakthrough?" Dessler and. Parson, Chapter 5
14° Nov 19th – 24th	Measuring and Minimizing the Carbon Footprint	WRI (2004). The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. **In class assignment #4**
15° Nov 26th – Dec 1st	**CLASS FINAL EXAM**	
16° Dec 3rd – 8th	**FINAL EXAMS**	

VIII. Readings

*** Required readings**

Houghton, John (2015) *Global Warming: The complete briefing*. 5th Edition. Cambridge: Cambridge University Press.

D. Archer and S. Rahmstorf (2010), *The Climate Crisis: An Introductory Guide to Climate Change*. Cambridge University Press.

A. Dessler and E.A. Parson (2010), *The Science and Politics of Global Climate Change: A Guide to the Debate.* Cambridge: Cambridge University Press, 2nd edition.

W.F. Ruddiman (2014), *Earth's Climate: Past and Future.* New York: W. H. Freeman.

Gupta, J. (2010). "A History of International Climate Policy." Wiley Interdisciplinary Reviews: Climate Change 1(5): 636-653.

IPCC (2014) *Climate Change 2014: Synthesis Report* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva, Switzerland: IPCC.

IP*CC (2014) Climate Change 2014: Impacts,Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge and New York.

World Resources Institute and World Business Council for Sustainable Development. (2004). *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (revised edition).*

*** Bibliografía complementaria**

N. Oreskes and E. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. Bloomsbury Press, ISBN-13: 978-1608193943.

Maslin, Mark. *Climate Change: A Very Short Introduction, Third Edition*. Oxford: Oxford UP, 2014. ISBN: 9780198719045

Pelling, M. 2011. Adaptation to climate change: from resilience to transformation, Routledge

IX. Instructor

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