PTYS212 The Science and Politics of Climate Change

Building Connections/Quantitative Reasoning and Writing

Kuiper Space Sciences Room 308, Tue/Thu 12:30-1:45pm

Description of Course

This course explores the science of climate change and the political and commercial issues related to global warming. The first part of the course focuses on the scientific basis of climate change. In this part, we will investigate the concepts and principles required for understanding planetary climates. We will assess the observational evidence for climate change and quantify the relative roles of natural and human drivers in causing it. We will also study the history of the Earth's climate and compare recent changes to historical trends. We will then examine predictions for the impact of future climate change on the environment and our lives. The second part of the course focuses on the political and commercial issues related to climate change mitigation. Here, we will explore the required reductions in greenhouse gas emissions to achieve the goals of international agreements and their impact from the perspective of policymakers, commercial interests, and the public.

Instructor and Contact Information

Tommi Koskinen, Kuiper Space Sciences (KSS) 421, 520-621-6939, tommik@arizona.edu

Office Hours: 2-3pm Tuesday and Thursday (or at any time by appointment)

https://www.lpl.arizona.edu/faculty/tommi-koskinen

Graduate Teaching Assistant

Harry Tang, tangy14@arizona.edu

Office Hour: 10-11am on Friday in LPL library (room KSS 409) or by appointment

https://www.lpl.arizona.edu/PMRG/person/harry-tang

Course Format and Teaching Methods

Lectures, individual and small group activities, homework assignments, quizzes, demonstrations, essay, group project and presentation

Course Objectives

During this course students will explore the key physical processes of radiative transfer, the greenhouse effect, and surface-atmosphere interactions that control planetary climates through in-class instruction, experiments, and other demonstrations. They will analyze and interpret observations and models to critically evaluate the scientific evidence for global warming and put recent changes in the context of historical climate trends. They will identify the causes and consequences of climate change and assess the relative roles of natural and human drivers through a quantitative analysis of the sources and sinks of greenhouse gases. They will explore climate change from the perspectives of policymakers, commercial interests, and the public to understand how science informs legislation and international agreements on climate change mitigation. They will then identify proposed policies and actions for climate change mitigation and generate ideas to support or oppose these policies in written reports and group discussions. Finally, they will communicate in writing the important elements of the science and politics of climate change to a variety of audiences.

Learning Outcomes

Students will demonstrate the ability to utilize multiple perspectives and make meaningful connections across disciplines and social positions, think conceptually and critically, and solve problems. Students will demonstrate competency in working with numerical information by critically analyzing quantitative information, generating ideas that are supported by quantitative evidence, assessing the relevance of data and its associated implications in the context of climate change, and communicating those ideas and/or associated interpretations using various formats (graphs, data tables, equations, oral presentations, or written reflections). Students will demonstrate rhetorical awareness and writing proficiency by writing for a variety of contexts and executing disciplinary genre conventions of organization, design, style, mechanics and citation format while reflecting on their writing development.

Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: https://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, http://policy.arizona.edu/human-resources/religious-accommodation-policy

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: http://policy.arizona.edu/employmenthuman-resources/attendance

Participating in and attending lectures and other course events are vital to the learning process. The lectures cover material that is not included in the textbook and include demonstrations, group work, presentations, and discussion. Attendance and participation in these activities counts towards your final grade. If you anticipate being absent, are unexpectedly absent, or are unable to participate in class activities, please contact the instructor.

Course Communications

Online communication will be conducted through D2L.

Recommended Textbook

Climate Change: The Science of Global Warming and Our Energy Future (2nd edition) by Edmond A. Mathez and Jason E. Smerdon (Columbia University Press, 2018). Available through the UArizona library for free: https://ebookcentral.proquest.com/lib/uaz/detail.action?docID=5276366

Required Extracurricular Activities

The course includes a signature assignment that includes tasks in and outside of class. More information about the signature assignment will be made available through the course D2L page in due course.

Assignments and Examinations: Schedule/Due Dates

There are six homework assignments, three mid-term quizzes, and a signature assignment. The current schedule of due dates for homework and components of the signature assignment (SA) is:

#1P: September 7

#1: September 17

#2: October 1

#3: October 15

#4: October 22

#5: November 5 (report for SA)

#6: November 9, 14 & 16: SA presentations

The anticipated schedule of quizzes is:

#1: September 21

#2: October 26

#3: November 30

Updates to the schedule will be communicated in class and posted on D2L.

Writing requirement

All Tier One and Tier Two General Education Courses are writing intensive. Writing assignments are incorporated into the course through homework assignments, in-class exercises, and the signature assignment.

Final Examination or Project

The signature assignment constitutes the final assessment for this course. The assignment consists of a technical report, group presentations, and a high-level summary of the reports and presentation. The students are required to write the technical reports independently, with a submission deadline of Sunday, November 5, 11.59pm. Student will then create a presentation based on the reports that will be given in class during the lectures on November 9, 14, and 17.

Grading Scale and Policies

Homework sheets: 30%

Quizzes: 30%

Signature assignment: 20%

In-class assignments and experiments: 20%

A: 90-100

B: 80-89.9

C: 65-79.9

D: 50-64.9

E: <50

There will be opportunities for extra credit that will be announced during the semester.

University policy regarding grades and grading systems is available at http://catalog.arizona.edu/policy/grades-and-grading-system

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete and http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal respectively.

Honors Credit

Students wishing to contract this course for Honors Credit should email the instructor to set up an appointment to discuss the terms of the contract. Information on Honors Contracts can be found at https://honors.arizona.edu/academics/honors-contracts.

Scheduled Topics/Activities

The anticipated class schedule is as follows:

Week 1: Introduction, forms of energy
Week 2: Light and spectra
Week 3: The atmosphere and the greenhouse effect
Week 4: Seasons and orbital cycles
Week 5: Quiz#1
Week 6: Greenhouse gas sources and sinks
Week 7: Solar energy and activity
Week 8: Atmospheric and ocean circulation
Week 9: Climate drivers and models
Week 10: Quiz#2
Week 11: The consequences of global warming
Week 12: Climate change mitigation
Week 13: Working group presentations
Week 14: A brief history of the Earth
Week 15: Quiz#3
Week 16: Conclusion

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

The use of laptops, iPads, and other such mobile devices is not permitted in class for any other purposes other than those directly related to the course (in-class activity or note taking).

Class recordings

For lecture recordings, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies (Code of Academic Integrity and the Student Code of

Conduct) are also subject to civil action. Other materials available through D2L must not be distributed in public without explicit permission.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity

Academic advising

If you have questions about your academic progress this semester, please reach out to your academic advisor (https://advising.arizona.edu/advisors/major). Contact the Advising Resource Center (https://advising.arizona.edu/) for all general advising questions and referral assistance. Call 520-626-8667 or email to advising@.arizona.edu

Life challenges

If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at (520) 621-2057 or DOS-deanofstudents@email.arizona.edu.

Physical and mental health challenges

If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520) 621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Safety on Campus and in the Classroom

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): https://cirt.arizona.edu/case-emergency/overview

Also watch the video available at https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/common/learningeventdetail/crtfy0000000000003560

University-wide policies link

Links to the following UA policies are provided here, https://academicaffairs.arizona.edu/syllabus-policies:

- Threatening Behavior Policy
- Accessibility and Accommodation Policy
- Nondiscrimination and Anti-Harassment Policy
- Subject to Change Statement