

ENVS 3525: Adapting to a Warming World
Spring 2020 | MWF 9:30-10:20 in SEEC N136
Credits: 3 units

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Office Hours: Wed. 10:30am-12:00pm in SEEC S238C or by appointment

Canvas Course URL: <https://canvas.colorado.edu/courses/58522>

COURSE DESCRIPTION AND LEARNING OBJECTIVES

Temperatures are already changing around the globe. In some places, average temperatures are rising. In others, temperature variability is shifting and the occurrence of extreme events (e.g. heat waves) is rising. What evidence do we have about how these temperature changes are affecting people and economies? What role can adaptation, such as the use of air conditioners or more drought-tolerant crops, play in limiting the negative effects of changing temperatures? We'll review available evidence and discuss implications for policies, such as those affecting diffusion of technologies to help vulnerable populations cope with heat.

By the end of the course, you will be able to

- Identify consequences of warmer and more variable temperatures for people, food systems, and both natural and built environments
- Understand and effectively communicate options for adaptation to warming
- Analyze costs, benefits, and distributional considerations of adaptation alternatives
- Critically evaluate adaptation policy proposals put forth by governments
- Construct defensible, equitable adaptation proposals that integrate science, social considerations, and policy context

How are we going to get there? Outside of class, you'll be asked to read, watch a few videos, and even play a game or two. When we meet as a group, we'll devote much of our time to discussing what you took away from those activities and questions. Some classes will involve lecture, while in others we'll engage in some activities to learn how behavior influences adaptation. Toward the end of the course, you'll also present adaptation project proposals to one another that you develop in groups. In short, my goal is for you to participate actively; climate adaptation is a new and evolving set of ideas, and you can play an important role in shaping it outside the classroom.

MUTUAL EXPECTATIONS

1. We'll all come prepared to class. Silent discussions are much less fun.
2. Respect one another and their ideas. They deserve it. Plus climate adaptation is something we don't yet know everything about, so the more ideas the better.
3. Be present. Use phones/laptops/tablets for learning, not as a distraction.

TOPICS AND APPROXIMATE SCHEDULE

Introduction

1. Overview (Week of Jan 13)
 - a. Introduction/Course overview
 - b. Adaptation: key definitions and examples
 - c. What are we adapting to? Recap of warming and related changes.
2. Tools and techniques (Week of Jan 20; no class on MLK day)
 - a. Thinking through uncertainty
 - b. Evaluating evidence: Experimental and quasi-experimental methods

Part 1: How will a hotter planet affect us and what *can* we do about it?

People

1. Impacts on people (Jan 27, 29)
 - a. Physical: Health, including mortality
 - b. Mental: Education, labor productivity
2. Adapting to effects on people (Jan 31-Feb 5)
 - a. Technology, including air conditioning and built environments
 - b. Information and behavioral adaptations, including early warning systems
 - c. Migration (changing exposure)

Agriculture

3. Impacts on food systems (Feb 7, 10)
 - a. Physical impacts on plants & animals: yields, losses, diseases
SHORT ASSIGNMENT #1 DUE (Feb 7)
 - b. Market impacts: price shocks, coordinated losses, transport, storage
4. Adapting to impacts on food systems (Feb 12-17)
 - a. Individual/business-level adaptations: e.g., crop choice, non-crop income
 - b. Coordinated & institutional responses: e.g., information, insurance, landscape-level diversification
 - c. Enabling adaptations: e.g., poverty & gender gaps; social networks

Natural and built environments

5. Impacts on natural and man-made systems (Feb 19-21)
 - a. Natural systems: biodiversity loss, land cover change
SHORT ASSIGNMENT #2 DUE (Feb 19)
 - b. Man-made infrastructure
6. Resistance and resilience in natural and man-made systems (Week of Feb 24)
 - a. Migration corridors, ecosystem services; improved materials
 - b. Midterm Review (Feb 26)
 - c. **MIDTERM EXAM (Feb 28)**

Part 2: What *should* we do to adapt to warming?

1. Basics (March 2-6)
 - a. Costs and benefits
 - b. Timing of benefits/costs
 - c. Equity & distributional considerations
2. Additional topics (March 9-13)
 - a. Adaptation vs (or as a complement to) mitigation
 - b. Adapting under uncertainty, including learning strategies
 - c. Maladaptation

Part 3: What *are* we doing to adapt to warming?

1. Individual level (March 16-20)
 - a. Examples of individual and firm-level adaptation
SHORT ASSIGNMENT #3 DUE (March 16)
 - b. Why aren't we doing more: overview
 - c. Why aren't we doing more: behavior

----- SPRING BREAK Week of March 23 -----
2. Local & state-level adaptation plans (March 30-April 3)
 - a. Boulder
 - b. Colorado
 - c. Other local plans
3. Federal/national level adaptation plans (April 6-10)
 - a. Federal government role in adaptation
 - b. Case Study: US
 - c. Other countries
4. International efforts (April 13-April 17)
 - a. Sharing information & knowledge
April 13: Adaptation plan critiques due on Canvas.
 - b. Technology transfer
 - c. International adaptation funds

Presentations (Weeks of April 20, 27):

- Adaptation project proposals
- 25 mins each; 20 min with 5 for questions.
- 10 slots total (max 10 groups. No more than 5 per group)

COURSE MATERIALS

There is no required textbook for the course. Instead, we will rely on a mix of popular press, peer-reviewed research, and materials from organizations engaged in climate adaptation. All materials will be accessible via the course Canvas website.

Evaluation/Grading

15% - RESPONSES TO AND QUESTIONS ABOUT READINGS

To facilitate in-class discussions, you'll submit reactions to and questions about readings on a regular basis. You should submit by these reactions and questions on Canvas by the start of class.

15% - CLASS PARTICIPATION

You are expected to show up to class and be actively engaged. Participation is part of your grade because it should help you better understand the material. You'll have many ways to participate, including small group discussions, activities, full group discussions, & technology-based exercises.

15% - MIDTERM EXAM (FEB 28)

During the regular class period on February 28, you will complete an exam covering material you've learned via readings, class sessions, and assignments prior to that date. If you have a valid religious or disability-based reason to take the exam at a different time or in a different place, please provide written documentation of your needs as soon as possible and we will make arrangements. No other exceptions will be made.

30% - ASSIGNMENTS (DUE FEB 7, FEB 19, MAR 16, & APR 13)

Throughout the semester, you'll complete four short assignments (weighted equally) intended to help you master some of the facts of adaptation to warming and tools used to evaluate potential adaptation options. The first two will cover impacts to people and food systems, as well as our options to adapt to them. The third will give you practice analyzing costs and benefits of adaptation, and in the fourth you'll evaluate a local adaptation plan.

25% - GROUP PRESENTATIONS (WEEKS OF APR 20, 27)

- 20% - Group presentation
In teams of roughly 5, you will propose an adaptation project in a 20 minute presentation, and answer audience questions for 5 minutes. Your presentation should cover 1) evidence of heat impacts you are seeking to reduce 2) the proposed adaptation activity, 3) an assessment of who will benefit (or not) from the activity, 4) a case for why the project is a good idea, and 5) your plan for evaluating success.
- 5% - Feedback on others' presentations
For each presentation, you will submit one aspect of the presentation you liked best and one constructive suggestion for improving the proposal.

There is NO FINAL EXAM in this course.

Late policy: Each day that an assignment is late, your grade for that assignment will be lowered by 5 percentage points, e.g., from 100 to 95, or from 83 to 78.

Grading scale: 93 and greater = A, 90-92.9 = A-, 87-89.9 = B+, 83-86.9 = B, 80-82.9 = B-, 77-79.9 = C+, 73-76.9 = C, 70-72.9 = C-, 67-69.9 = D+, 63-66.9 = D, 60-62.9 = D-, 60 and below = F. I may curve grades upward at the end of the semester when all work is complete. I will not curve grades down.

UNIVERSITY RULES WE WILL ALL ABIDE BY

ACCOMMODATION FOR DISABILITIES

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see [Temporary Medical Conditions](#) under the Students tab on the Disability Services website.

CLASSROOM BEHAVIOR

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Code of Conduct](#).

PREFERRED STUDENT NAMES AND PRONOUNS

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

HONOR CODE

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

SEXUAL MISCONDUCT, DISCRIMINATION, HARASSMENT AND/OR RELATED RETALIATION

The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, intimate partner abuse (including dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

RELIGIOUS HOLIDAYS

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, I ask that you **notify me as soon as possible** of any conflicts due to religious obligations, and we will work together to find a suitable arrangement.

See the [campus policy regarding religious observances](#) for full details.