

ENVS 2: Introduction to Environmental Science

Winter Term 2024

11:30-12:35 MWF (x-hour Tues. 12:15-1:05)

Class meeting location: LSC 200

Prof. Bala Chaudhary

Office Hours: Tues. 2:30-3:30 pm or by appointment. Location: Steele 111

bala.chaudhary@dartmouth.edu (Expect a response within 48 hours)

Prof. Morgan Peach

Office Hours: Mon. 1:00-2:00 pm or by appointment. Location: Fairchild 102

morgan.edward.peach@dartmouth.edu (Expect a response during business hours)

Graduate Teaching Assistant: Genevieve M. Goebel

Office Hours: Wed. 4:00-5:00 pm or by appointment. Location: LSC 133 or Zoom ([link](#))

genevieve.m.goebel.gr@dartmouth.edu

Course Description

This course provides an overview of how the natural world works, how humans interact with it and how we can use evidence-based approaches to protect, restore, and sustain it for the future. Within diverse social contexts, we will introduce you to the key biological, chemical, physical, and ecological principles of environmental science. We take a solutions-focus to explore five course themes (sustainability, climate, biodiversity, food, and water) and share hopeful stories of how people are confronting environmental challenges with creativity. We will explore how environmental science can support pathways to equitable, inclusive solutions. We will do so by highlighting “Voices of Equity” from scientists and communities from traditionally underrepresented groups in the environmental sciences who are developing solutions to our most pressing environmental problems. This introductory, lecture-focused class will include readings, documentary screenings, written reflections, quizzes, in-class interaction, and exams to support your learning.

Learning Objectives

1. Demonstrate understanding of the physical, chemical, biological, and social principles underlying Earth’s major environmental problems and solutions.
2. Recognize the interconnections among the different biophysical and social scientific disciplines and how their principles are used in investigating the environment.
3. Examine the efforts of scientists, policy makers, and community members working to develop solutions to environmental problems.
4. Utilize scientific inquiry processes (e.g. draw inference from data) to understand environmental solutions.

Recommended Text

Withgott & Laposata, *Environment: The Science Behind the Stories*, 7th Edition

This textbook is not required, but highly recommended, particularly if science courses have not been your forte. It can be purchased new, used, or rented. If you have trouble finding the most recent edition, **it is totally acceptable to get the 6th edition**. If you face financial difficulty accessing the textbook please contact us.

We will assign supplementary materials (i.e., readings, films, and other digital documents) and make them available to you on the course Canvas site.

Assignments & Evaluation

Personal Bio (10pts, 2% of grade)

Post an introduction of yourself to the class and familiarize yourself with Canvas, Dartmouth's online course management system. Tell us and your classmates about your academic and extra-curricular interests and what environmental topics interest you the most.

Media Reflection (5 reflections; each 20pts or 4.4% of grade; 100 pts total or 22% of grade)

We will introduce each unit with a documentary film to be watched outside of class. For each film (and a podcast), we will ask you to write a ~300 word reflection in response to a prompt asking you to draw connections between your life and topics explored in the film. Reflections will be submitted via Canvas.

Unit Quizzes (5 quizzes; each 30pts or 6.6% of grade; 150 pts total or 33% of grade)

After each unit, there will be an in-person quiz. Quizzes will consist of ~10 questions based on content from lectures, readings, and films. Quizzes are meant to help reinforce your understanding of course content and prepare you for exams.

Exams (2 exams; each 100pts or 21.5% of grade; 200pts total or 43% of grade)

There will be one in-person midterm and an in-person final examination. These examinations are an opportunity to demonstrate your progress towards course learning objectives. The exams will be similar in format to quizzes, but longer, and NOT cumulative, i.e. the midterm will cover the first half of class content, and the final exam the second half. The final exam time is set by the university and cannot be changed - please plan any spring break travel accordingly.

Course Structure

The course is structured into five thematic units in a repeating, learning rhythm. We will begin each unit by viewing a documentary film or listening to a podcast. We will then explore environmental science principles, problems, and solutions pertinent to the film or podcast. Throughout, we will highlight "Voices of Equity" leading the way devising solutions.

| ENVS 2, Winter 2024, Course Outline | | |
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| Week #1 - Sustainability, Policy, Ethics, Ecosystem Services (SPEES) | | |
| Class 1 - Wed. Jan. 3 | Introduction, course themes (BC and MP) | Recomm. Reading: Ch. 1 |
| Class 2 - Fri. Jan. 5 | Ecosystem services, sustainability (MP) | Personal Bio Reading: "What I Know About the Ocean" by A. E. Johnson; Recomm. Reading: Ch. 6 |
| Week #2 – SPEES to Climate | | |
| Class 3 - Mon. Jan. 8 | The history of environmental science, ethics, policy (BC) | Film reflection & discussion Recomm. Reading: Ch. 7 |
| Tues. Jan. 9 x-hour 12:15-1:05 | Quiz #1 - SPEES, in person | Quiz #1 - SPEES |
| Class 4 - Wed. Jan. 10 | Energy and thermodynamics (MP) | Recomm. Reading: Ch. 2 |
| Class 5 - Fri. Jan. 12 | Earth's biogeochemical cycles (BC) | Recomm. Reading: Ch. 5 |
| Week #3 – Climate | | |
| Mon. Jan. 15 - No Class | Martin Luther King. Jr. Day | |
| Class 6 - Wed. Jan. 17 | Climate change science & evidence (BC) | Film reflection & discussion Recomm. Reading: Ch. 18 |
| Class 7 - Fri. Jan. 19 | Climate change impacts on humans and the environment (BC) | Reading: "The Fog After the Storm" by Mary Annaïse Heglar |
| Week #4 – Climate to Biodiversity | | |
| Class 8 - Mon. Jan. 22 | Climate solutions: part I (MP) | Recomm. Reading: Ch. 20 |

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| Class 9 - Wed. Jan. 24 | Climate solutions: part II (BC) | Quiz #2 - Climate TBD Recomm. Reading: Ch. 21 |
| Class 10 - Fri. Jan. 26 | Introduction to Biodiversity: Why does biodiversity matter? (MP) | Film reflection & discussion Recomm. Reading: Ch. 11 |
| Week #5 - Biodiversity | | |
| Class 11 - Mon. Jan. 29 | Population & Community Ecology (MP) | Recomm. Reading: Ch. 4 |
| Tues. Jan. 30 x-hour 12:15-1:05 | Midterm Exam Review | |
| Class 12 - Wed. Jan. 31 | Biodiversity conservation and ecosystem restoration (BC) | Reading: Black farmers & conservation Recomm. Reading: Ch. 12 |
| Class 13 - Fri. Feb. 2 | Midterm Exam in class | Midterm Exam |
| Week #6 – Biodiversity to Food | | |
| Class 14 - Mon. Feb. 5 | Applications of ecology: TBD | |
| Class 15 - Wed. Feb. 7 | Evolution: maintenance of biodiversity (MP) | Recomm. Reading: Ch. 3 |
| Class 16 - Fri. Feb. 9 | Introduction to food systems and agriculture (BC) | Recomm. Reading: Ch. 10 |
| Week #7 – Food | | |
| Class 17 - Mon. Feb. 12 | The diversity of agricultural practices (BC) | Podcast reflection & discussion |
| Tues. Feb. 13 x-hour 12:15-1:05 | Quiz #3 - Biodiversity, in person | Quiz #3 - Biodiversity |
| Class 18 - Wed. Feb. 14 | Urban food systems (MP) | Recomm. Reading: Ch. 13 |

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| Class 19 - Fri. Feb. 16 | Soil ecological systems for climate and human health (BC) | Recomm. Reading: Ch. 9 |
| Week #8 – Food to Water | | |
| Class 20 - Mon. Feb. 19 | Food's links to climate, biodiversity, and water (MP) | Reading: Hawaii's ancient aquaculture revival |
| Tues. Feb. 20 x-hour 12:15-1:05 | Quiz #4 - Food, in person | Quiz #4 - Food |
| Class 21 - Wed. Feb. 21 | Water Introduction: dynamics, quality, and regulation (MP) | Recomm. Reading: Ch. 15 |
| Class 22 - Fri. Feb. 23 | Water's links to climate, biodiversity, and food (MP) | Recomm. Reading: Ch. 16 |
| Week #9 – Water | | |
| Class 23 - Mon. Feb. 26 | Water pollution (BC) | Film reflection & discussion |
| Class 24 - Wed. Feb. 28 | Solutions to water crises: science and technology (BC) | Reading: Paiute water management |
| Class 25 - Fri. March 1 | Solutions to water crises: community solutions and policy (MP) | Quiz #5 - Water TBD |
| Week #10 – The Hopeful Takeaway | | |
| Class 26 - Mon. March 4 | Reflection & Synthesis (BC and MP) | |
| Tues. March 5 x-hour 12:15-1:05 | Final Exam Review | Final Exam: Sunday March 10, 8am, in person |

Unit-by-Unit Media Assignments

1. Sustainability, Policy, Ethics, Ecosystem Services (SPEES)

Documentary: RISE: Sacred Water, Standing Rock Part 1 & RISE: Red Power, Standing Rock Part 2, by Viceland, 2017, <https://www.amazon.com/Rise-Season-1/dp/B01N9X709H>

2. **Climate**

Documentary: Before the Flood, by National Geographic, 2016
Available online at Alexander Street via Dartmouth College Library

3. **Biodiversity**

Documentary: Extinction: The Facts, by PBS, 2020
Available online at Alexander Street or PBS via Dartmouth College Library

4. **Food**

Podcast: 1619 Episode 5 Part I and II, The Land of our Fathers, 2019
Available free wherever you get your podcasts (Spotify, New York Times Magazine).

5. **Water**

Documentary: Poisoned Water, 2017, by PBS, NOVA, Season 4, Episode 17, Available online at Alexander Street via Dartmouth College Library

Suggestions for doing well in this class

1. Attend all lectures (but see covid policies below)
2. Review Canvas and this syllabus regularly
3. Take detailed notes. Recopy your notes, ideally less than 48 hours after lecture
4. Participate, stay engaged, and ask questions
5. Form study groups to discuss concepts and help retain information
6. Seek help from us EARLY in the term if you are having trouble

Attendance and Illness

We value your presence in class as a special opportunity for active engagement with in-person learning. We will often create times in class for discussion and other activities that promote learning through interaction with your peers. Your attendance will enhance your learning, period. That said, we value the maintenance of a safe learning environment for Dartmouth students and faculty. For the health and safety of our class community, please do not attend class when you are sick or when you have been instructed by the Student Health Services to stay home. **In accordance with Dartmouth policy, you are required to wear a face mask if you have cold-like symptoms or have been in contact with someone who has COVID-19.** You are also welcome to wear a mask at any time in class or during office hours regardless of symptoms or exposure. If you feel more comfortable wearing a mask around others, you are encouraged to do so. Please be respectful of those who choose to wear a face mask, and do not ask about one another's health or family situation.

Technology Use & Note Taking

Please silence your phone and put it away. You may use a computer or tablet in class, although we highly encourage active note taking using pen and paper. Physically writing notes has been shown to aid in memory retention and enhance understanding of material presented in class. In science classes, it is often useful to be able to draw graphs and pictures as well. We will make lecture slides available on Canvas, but they contain little text. This is intentional to provide a skeleton to supplement your extensive lecture notes.

Student Accessibility & Accommodations

Students requesting disability-related accommodations and services for this course are required to register with Student Accessibility Services (SAS; [Getting Started with SAS webpage](#); student.accessibility.services@dartmouth.edu; 1-603-646-9900) and to request that an accommodation email be sent to us in advance of the need for an accommodation. Then, students should schedule a follow-up meeting with one of us to determine relevant details such as what role SAS or its [Testing Center](#) may play in accommodation implementation. This process works best for everyone when completed as early in the quarter as possible. If students have questions about whether they are eligible for accommodations or have concerns about the implementation of their accommodations, they should contact the SAS office. All inquiries and discussions will remain confidential.

General Discussion Agreements

Throughout the course, we will employ active participation and engaged learning experiences as much as possible. This includes small group discussions and/or pair-and-share activities. In these settings, the following collaborative learning practices will be helpful:

- Share the “air time”
- Speak from your own experience and what has meaning for you; avoid generalizing
- Be open-minded: listen to and respect others’ points of view, suspend judgment
- Be curious: seek to understand, ask questions
- Learn from disagreement (and facilitator allow time for counter-perspectives)
- Assume good intentions, don’t feel offended and express this if you do
- Be willing to “mess up”, have compassion

Diversity & Inclusion

The environmental sciences have a diversity problem. In the U.S., our field lags far behind other STEM disciplines with respect to diversity, equity, and inclusion across a variety of dimensions, suffering from a history of misogynistic, racist, colonialist, and ableist roots. This history is reflected in the paucity of resources (e.g. textbooks, readings) available to teach an introductory environmental science class with diverse perspectives. Moreover it hinders our ability to tackle environmental challenges in a way that results in lasting, equitable impacts. As your instructors, we work hard to identify and elevate diverse voices in the environmental sciences through films, essays, and case studies. We are also deeply committed to cultivating an inclusive classroom community that is respectful of differences in identity. We ask that all students join us in striving to become more aware of our individual biases and positionality as we encounter topics in class related to diversity, equity, and inclusion. More than a statement in this syllabus, we hope we demonstrate our commitment to equity in the readings, lectures, and discussions we have planned for this course. Actions speak louder than words, so to speak. Also do not hesitate to contact us if you have any concerns. Your feedback and our collective commitment to honoring diversity and valuing inclusivity will aid us in cultivating an anti-racist, supportive, and respectful learning community.

Academic Integrity

Students are called upon to know, respect, and practice both the [Dartmouth Academic Honor Principle](#) and the [Dartmouth Community Standards and Accountability](#). Violations of the Honor Principle include giving or receiving unauthorized assistance on examinations or quizzes, any form of plagiarism (e.g. copying or paraphrasing sources without appropriate citation, self-plagiarism), use of the same work in more than one course without prior approval of all professors, and unauthorized collaboration. **Because sources are unclear, the use of ChatGPT and other generative AI tools is not permitted on assignments and assessments.** The minimum penalty for Honor Principle violations is an F grade on each offending assessment with potential further recommendations for sanctions or expulsion.

Mental Health & Wellness

The academic environment at Dartmouth is challenging, our terms are intensive, and classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including your undergraduate dean (<https://students.dartmouth.edu/undergraduate-deans/>), Counseling and Human Development (<https://students.dartmouth.edu/health-service/counseling/about>), and the Student Wellness Center (<https://students.dartmouth.edu/wellness-center/>). We encourage you to use these resources to take care of yourself throughout the term, and to come speak to us if you experience any difficulties.

Title IX

At Dartmouth, we value integrity, responsibility, and respect for the rights and interests of others, all central to our Principles of Community. We are dedicated to establishing and maintaining a safe and inclusive campus where all have equal access to the educational and employment opportunities Dartmouth offers. We strive to promote an environment of sexual respect, safety, and well-being. In its policies and standards, Dartmouth demonstrates unequivocally that sexual assault, gender-based harassment, domestic violence, dating violence, and stalking are not tolerated in our community.

The Sexual Respect Website (<https://sexual-respect.dartmouth.edu>) at Dartmouth provides a wealth of information on your rights with regard to sexual respect and resources that are available to all in our community.

Please note that, as faculty members, we are obligated to share disclosures regarding conduct under Title IX with Dartmouth's Title IX Coordinator. Confidential resources are also available, and include licensed medical or counseling professionals (e.g., a licensed psychologist), staff members of organizations recognized as rape crisis centers under state law (such as WISE), and ordained clergy (see https://dartgo.org/titleix_resources).

Should you have any questions, please feel free to contact Dartmouth's Title IX Coordinator or the Deputy Title IX Coordinator for the Guarini School. Their contact information can be found on the sexual respect website at: <https://sexual-respect.dartmouth.edu>.

Socioeconomic Differences & Financial Difficulty

If you encounter financial challenges related to this class, please let us know.

Religious Observances

Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with us before the end of the second week of the term to discuss appropriate accommodations.

Syllabus Changes

This syllabus is subject to change to better meet the learning objectives of this class and support your learning. We will notify you well in advance of any changes to aid in your planning.