

ENVS 2: Introduction to Environmental Science

Winter Term 2022

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

Class meeting location: Wilder 104

Prof. Bala Chaudhary

Zoom Coffee Hours: Tues. 12pm - 2pm or by appointment

<https://dartmouth.zoom.us/j/6140030358>

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Prof. Morgan Peach

Zoom Coffee Hours ([link](#)): Mon. 1pm - 3pm or by appointment

morgan.edward.peach@dartmouth.edu

Teaching Assistant: Shauna Bulger

Zoom Coffee Hours: Wed. 3pm - 4pm or by appointment, Steele 105

<https://dartmouth.zoom.us/j/5702100527>

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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. construct testable hypotheses, 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.

Film 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, 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 a quiz in Canvas. 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. Quizzes will be assigned and evaluated within Canvas.

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

There will be one midterm and a final examination that will be administered via Canvas. 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.

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. We will then explore environmental science principles, problems, and solutions pertinent to the film. Throughout, we will highlight "Voices of Equity" leading the way devising solutions.

ENVS 2, Winter 2022, Course Outline		
Week #1 - Sustainability, Policy, Ethics, Ecosystem Services (SPEES)		
Class 1 - Wed. Jan. 5th	Introduction, course themes (BC and MP)	Recomm. Reading: Ch. 1
Class 2 - Fri. Jan. 7th	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. 10th	The history of environmental science, ethics, policy (BC)	Film reflection & discussion Recomm. Reading: Ch. 7
Class 4 - Wed. Jan. 12th	Energy and thermodynamics (MP)	Quiz #1 - SPEES Recomm. Reading: Ch. 2
Class 5 - Fri. Jan. 14th	Earth's biogeochemical cycles (BC)	Recomm. Reading: Ch. 5
Week #3 - Climate		
Mon. Jan. 17th - No Class	Martin Luther King. Jr. Day	
Class 6 - Wed. Jan. 19th	Climate change science & evidence (BC)	Film reflection & discussion Recomm. Reading: Ch. 18
Class 7 - Fri. Jan. 21st	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. 24th	Climate solutions: part I (MP)	Recomm. Reading: Ch. 20
Class 9 - Wed. Jan. 26th	Climate solutions: part II (BC)	Quiz #2 - Climate Recomm. Reading: Ch. 21

Class 10 - Fri. Jan. 28th	Introduction to Biodiversity: Why does biodiversity matter? (MP)	Film reflection & discussion Recomm. Reading: Ch. 11
Week #5 - Biodiversity		
Class 11 - Mon. Jan. 31st	Population & Community Ecology (MP)	Recomm. Reading: Ch. 4
Tues. Feb. 1st x-hour 12:15-1:05	Midterm Exam Review	
Class 12 - Wed. Feb. 2nd	Biodiversity conservation and ecosystem restoration (BC)	Reading: Black farmers & conservation Recomm. Reading: Ch. 12
Class 13 - Fri. Feb. 4th	No class	Midterm Exam
Week #6 – Biodiversity to Food		
Class 14 - Mon. Feb. 7th	Wildlife crime (BC)	
Class 15 - Wed. Feb. 9th	Evolution: maintenance of biodiversity (MP)	Quiz #3 - Biodiversity Recomm. Reading: Ch. 3
Class 16 - Fri. Feb. 11th	Introduction to food systems and agriculture (BC)	Film reflection & discussion Recomm. Reading: Ch. 9
Week #7 - Food		
Class 17 - Mon. Feb. 14th	The diversity of agricultural practices (MP)	Reading: Hawaii's ancient aquaculture revival Recomm. Reading: Ch. 10
Class 18 - Wed. Feb. 16th	Urban food systems (MP)	Recomm. Reading: Ch. 13
Class 19 - Fri. Feb. 18th	Food's links to climate, biodiversity, and water (MP)	Quiz #4 - Food
Week #8 – Food to Water		
Class 20 - Mon. Feb. 21st	Soil ecological systems for climate and human health (BC)	

Class 21 - Wed. Feb. 23rd	Water Introduction: dynamics, quality, and regulation (MP)	Film reflection & discussion Recomm. Reading: Ch. 15
Class 22 - Fri. Feb. 25th	Water pollution (BC)	Recomm. Reading: Ch. 16
Week #9 - Water		
Class 23 - Mon. Feb. 28th	Water's links to climate, biodiversity, and food (MP)	
Class 24 - Wed. March 2nd	Solutions to water crises: science and technology (BC)	Reading: Paiute water management
Class 25 - Fri. March 4th	Solutions to water crises: community solutions and policy (SB)	Quiz #5 - Water
Week #10 – The Hopeful Takeaway		
Class 26 - Mon. March 7th	Reflection & Synthesis (BC and MP)	
Tues. March 8th x-hour 12:15-1:05	Final Exam Review	Final Exam TBD

Unit-by-Unit Documentary Films

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

Documentary: Cowspiracy: the sustainability secret, 2014, by First Spark Media & Kip Andersen
To be available to stream via the course Canvas site

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

COVID-19 Policies

We expect you to attend class in person unless you have made alternative arrangements due to illness, medical reasons, or the need to isolate due to COVID-19. 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 current College policy, all members of the Dartmouth community are required to wear a suitable face covering when indoors, regardless of vaccination status. This includes our classroom and other course-related locations, such as office hours. If you need to drink during class, please dip your mask briefly for each sip. Eating is never permitted in the classroom. The only exception to the mask requirement is for students with an approved disability-related accommodation. If you do not have an accommodation and refuse to comply with masking or other safety protocols, the instructors are obligated to ensure that the Covid health and safety standards are followed, and you will be asked to leave the classroom. If you refuse to comply with masking or other safety protocols, and to ensure the health and safety of our community, the instructors are obligated to report you to the Dean's office for disciplinary action under Dartmouth's Standards of Conduct.

Attendance and Participation

We value your presence in class, as a special opportunity for active engagement with in-person learning. We will often create time 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. **Please do not come to class if you are sick.** Lectures will be recorded and made available via Canvas to help ensure that any students who are sick or isolating can still participate. Please note that recorded lectures are being provided as an additional resource for students facing a health-related hardship - they are not a substitute for active learning and participation in class.

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 paper and a pencil. 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 and mainly serve as a skeleton for 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

Although this course is primarily lecture-based and large in size (~100 students), 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)
- Feel free to “pass”
- 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, colonialistic, 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. 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.

Consent to Record

We will be using classroom capture technology in this class to make recordings of our lectures available. We also include the following contractual language as we may need to conduct this course remotely depending on the pandemic circumstances.

(1) Consent to recording of course meetings and office hours that are open to multiple students. By enrolling in this course, a) I affirm my understanding that the instructor may record meetings of this course and any associated meetings open to multiple students and the instructor, including but not limited to scheduled and ad hoc office hours and other consultations, within any digital platform, including those used to offer remote instruction for this course. b) I further affirm that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part, and my distribution of any of these recordings in whole or in part to any person or entity other than other members of the class without prior written consent of the instructor may be subject to discipline by Dartmouth up to and including separation from Dartmouth.

(2) Requirement of consent to one-on-one recordings

By enrolling in this course, I hereby affirm that I will not make a recording in any medium of any one-on-one meeting with the instructor or another member of the class or group of members of the class without obtaining the prior written consent of all those participating, and I understand that if I violate this prohibition, I will be subject to discipline by Dartmouth up to and including separation from Dartmouth, as well as any other civil or criminal penalties under applicable law. I understand that an exception to this consent applies to accommodations approved by SAS for a student's disability, and that one or more students in a class may record class lectures, discussions, lab sessions, and review sessions and take pictures of essential information, and/or be provided class notes for personal study use only.

If you have questions, please contact the Office of the Dean of the Faculty of Arts and Sciences.

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.