

# Solving Climate Change and Environmental Challenges in the US and Abroad

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FAS 4.A05, First Year Advising Seminar

Fall 2026

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| Instructor   | Professor John E. Fernández                            |
| Meeting      | Wednesdays, 3:00–4:00 p.m.                             |
| Location     | W41-5404 and various locations changing weekly         |
| Units        | 3-0-0                                                  |
| Eligibility  | First-year undergraduates; no prerequisites            |
| Contact      | <a href="mailto:fernande@mit.edu">fernande@mit.edu</a> |
| Office hours | By appointment                                         |

## Seminar description

This seminar introduces students to environmental challenges in the US and across the globe. We will do this by meeting and talking with amazing professors and researchers across MIT who are working on the science, technology, design, and policy related to many of the major issues of the planet. In visiting these professors and researchers in their labs and workplaces we will discuss the principles of sustainability and explore diverse topics including the science and policy of climate change, material and energy needs of the modern world, the prospects for meaningful circular economies, biodiversity and the bioeconomy and more. Prof. Fernandez, as co-founder of MIT Environmental Research + Action (<https://eralabs.mit.edu>), will guide the seminar through various departments, research groups, and labs to engage MIT faculty and researchers on the pressing environmental questions of our time. The goal of this seminar is to introduce first year students to the rich mosaic of work at MIT oriented toward the environment and the prospect of improving human life and all life on Earth. The sessions will also be an ideal way in which to learn more about the many opportunities for exploring the range of expertise at MIT and directing your studies as an undergraduate toward improving the state of the planet.

The seminar treats climate change as a systems challenge: physical processes interact with technology, materials, cities, ecosystems, economies, institutions, and questions of justice. We will learn directly from MIT researchers working across this landscape, practice asking productive interdisciplinary questions, and consider how students can participate through coursework, research, campus activity, and public service. Sessions will combine short framing conversations, guest or site engagement, student questions, and reflection. The course emphasizes curiosity, respectful dialogue, evidence-based reasoning, and exploration rather than prior expertise. This seminar introduces first-year students to MIT's broad community of environmental scholarship and action. Through conversations with faculty and researchers—and visits to laboratories and workplaces—students will examine how science, technology, design, and policy can address climate change and related environmental challenges in the United States and around the world. The seminar also helps students connect these issues to academic exploration, advising, UROPs, and possible paths through MIT.

### **Intended learning objectives**

By the end of the semester, students will be able to:

- Describe how scientific, technological, design, economic, and policy perspectives frame major climate and environmental challenges.
- Compare mitigation, adaptation, conservation, and circular-economy approaches using evidence, tradeoffs, scale, feasibility, and equity.
- Connect environmental challenges in the United States with international contexts, institutions, and uneven impacts.
- Formulate informed questions for researchers and synthesize insights from laboratory visits and discussions.
- Map MIT subjects, departments, research groups, UROPs, and other opportunities relevant to personal academic interests.
- Develop and communicate a concise, evidence-based proposal for further learning or action on an environmental challenge.

### **Learning materials and preparation**

There is no required textbook. Short readings, videos, data visualizations, and other materials will be provided by the instructor.

### **Course work and evaluation**

Attendance and engagement in discussion is the only requirement of the course. Therefore, 100% of the grade will be based on attendance.

### **Weekly schedule**

The seminar is comprised of visits to labs and offices of professors at MIT working on aspects of climate change and other environmental challenges. The locations of the visits will be communicated to students by email in a timely manner – generally a few days before the visit.

### **Participation, attendance, and absences**

Because learning depends on live discussion and visits, attendance matters. As noted above, attendance is the only expectation of students taking this seminar. At the same time, illness, disability, religious observance, family responsibilities, and other circumstances can affect participation. If you must miss class, contact the instructor as soon as reasonably possible. Do not attend in person when you are ill or when doing so would put you or others at risk. The usual make-up is a short alternative activity or reflection; the instructor and student will identify an equitable option when a visit cannot be replicated.

For foreseeable conflicts, communicate early. If circumstances are affecting several courses or your well-being, your advisor, associate advisor, Student Support Services, or another trusted MIT support resource can help coordinate support.

**Communication and course changes**

Any change to the subject will be communicated to the students by Fernandez by email. The instructor will normally respond to messages within two business days. Urgent personal or safety concerns should be directed to the appropriate MIT resource rather than waiting for a course-email response.

The schedule may change to accommodate guest availability, site access, or emerging events. The learning objectives will remain stable unless a change benefits students and is achievable.

**Community agreements**

- Engage ideas with curiosity and critique claims with evidence; do not dismiss people.
- Make space for different forms of participation, disciplinary backgrounds, identities, and lived experience.
- Avoid assuming that any student speaks for a place, culture, community, or identity group.
- Treat lab visits and conversations responsibly. Ask before photographing, recording, or sharing unpublished work.
- Practice “step up, step back”: contribute when you can and create room for others.
- Name uncertainty, revise views when evidence warrants, and distinguish disagreement from disrespect.

**Access and inclusion**

Every student should be able to participate fully in the seminar. If any aspect of the course—including a laboratory visit, travel route, sensory environment, discussion format, or otherwise —creates an access barrier, contact the instructor for an effective alternative. Students seeking formal accommodations should work with MIT Disability and Access Services.

Students may use their chosen name and pronouns. Please tell the instructor privately about pronunciation, identity, access, religious observance, caregiving, or other considerations that would help create an effective learning environment.

**Student support and well-being**

MIT offers academic, personal, medical, and emergency support. Useful starting points include Student Support Services, Student Mental Health and Counseling, Disability and Access Services, Violence Prevention and Response, the Office of Religious, Spiritual, and Ethical Life, and the Ombuds Office. For immediate danger, call MIT Police at 617-253-1212 or 911. Current links and after-hours instructions are available through MIT’s student support and emergency websites.

As an advising seminar, this course is also a place to ask how MIT works. The seminar will allow time to ask questions about academic choices, UROPs, workload, belonging, or where to find help.

**AI Policy**

AI tools may be used in any part of the subject.