ENV H 448/548 A Wi 23: Community Air Pollution

Syllabus, Winter 2023

Monday, Wednesday, and Friday, 10:30-11:20

[Health Sciences Education Building Room 101](#)

Instructor

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Course web site: https://canvas.uw.edu/courses/1612713

Office hours: By appointment.

Prerequisites:

Undergraduate student - Environmental Health student, or at least chemistry and introductory biology, or permission of instructor

Graduate student - SPH graduate student, graduate student in related health or science field, or permission of instructor

Course overview

This 3-credit course uses a lecture/seminar format, and makes use of local air pollution management resources, to provide a comprehensive overview of community air pollution. Topics covered include: 1) air pollution sources, chemistry and meteorology; 2) effects on human health and the environment; 3) climate change; 4) air quality standards, monitoring and management; 5) air pollution control technology; 6) indoor air; 7) special topics, including wildfire smoke, environmental justice and alternative fuels.

Instruction is at the level of upper-year undergraduates and graduate students in health-related or related technical fields; there are higher expectations and more requirements of graduate students including an introduction to using the R programming language for summarizing air quality data. While a relatively comprehensive survey of air pollution topics is provided, there is a clear public health orientation.

Learning objectives

At the end of this course the student should be able to:

1. Classify and identify major sources of outdoor air pollution.
2. Outline the features of National Ambient Air Quality Standards (NAAQS).
3. Describe how meteorology affects air pollution using qualitative and quantitative approaches.
4. Describe the atmospheric chemistry involved in the formation of secondary air pollutants.
5. Identify primary health effects associated with criteria air pollutants.
6. Compare identified health effects of the different air pollutants.
7. Contrast the scientific methods and study designs used to learn about the health effects of air pollution.

8. Differentiate the welfare effects of air pollution from human health effects.
9. Propose effective strategies for controlling air pollution emissions and for reducing community exposures.
10. Distinguish criteria air pollutants from hazardous air pollutants and compare their respective air quality management approaches.
11. Describe how air quality contributes to environmental injustice and social inequality.
12. Identify the pollutants, including greenhouse gases, that affect climate and describe how they contribute to climate change.
13. Describe the major activities of the Puget Sound Clean Air Agency (PSCAA).
14. Describe community-based air monitoring and contrast this approach to regulatory monitoring.
15. Explain sources of indoor air pollution and describe the health effects of each.
16. GRADUATE STUDENTS: Evaluate and synthesize quantatitive impacts of air pollution.

Student Responsibilities

All students taking this class are expected to use the associated Canvas site to find course materials, determine due dates for homework and testing, find course syllabus and access contact information for instructor and TA. Students are expected to maintain academic integrity policies, be open and welcoming to their peers and engage with course material in a constructive manner during class time. Students are encouraged to communicate with instructor and TA as needed.

Course requirements and grading policy

1. **Homework**

Short, frequent on-line homework assignments (approximately 7) focused on class presentations and readings.

You will have one week to complete each homework assignment. Homework will be submitted and returned online through Canvas. Homework should be submitted in .docx or .pdf format. A late assignment will be docked 10% for each day that it is late up until the homework key is released or the answers are reviewed in class. After that point, late homework will not be accepted. If you have any extenuating circumstances and cannot turn in a homework assignment within that time frame, please contact Dr. Austin to set up an alternate arrangement.

Grading:

Undergraduate: 25%

Graduate: 25%

2. **Class participation**: Your participation grade will be based on your classroom participation as wella as well as your completion of in-class exercises. You must make arrangements with the instructor if you cannot attend in-class exercises. You will receive 5 points for in-class exercises and 5 points for attending class, contributing to discussion and completing your readings.

Prepare for, attend and engage in classroom discussion of assigned topics and readings. (5 points)

Submit in-class exercises. These are not graded. (5 points)

Grading:

Undergraduate: 10%

Graduate: 10%

3. **Mid-term examination**

In-class, open-book, open-notes (no internet) short answer format

Grading:

Undergraduate: 30%

Graduate: 20%

4. **Final examination**

Exam week, in-class, open-book, open-notes (no internet) short answer and essay format

Comprehensive, but focused on material since the mid-term exam

Grading:

Undergraduate: 35%

Graduate: 20%

5. **Project** (for <u>graduate students only</u>)

Small groups (3 – 4 students)

Prepare a short report that characterizes the air quality problems in a major US (or international) city, specifically relating to PM$_{2.5}$ and ozone. This should focus on concentrations and their spatial and temporal trends, air pollution sources, risk of noncompliance with air quality standards, and finally a quantitative assessment of the impact of improvements in air quality on indicators of health and monetary costs using BenMAP-CE.

Write-up: Length – approximately 25 pages (double-spaced) including figures and tables, excluding references/sources.

In-class team presentation of the report to the class – 30 minutes

Grading: 25% of graduate student grade

Communication Skills

Communication through writing and speaking is an important transferable skill for all career pathways. Establishing a strong foundation in communication skills will help you be successful throughout your future course work and career. Therefore, this course includes assignments with the goal to help you identify areas of strength and improvement in your communication. If you feel that you could benefit from additional opportunities to improve your writing skills in particular, a list of resources at the UW and others accessible online can be found on the SPH website at https://sph.washington.edu/sites/default/files/inline-files/Writing-Resources-4.3.19.pdf.

Important Policies & Resources

Absence Policy

While attendance to all live sessions (in-person and virtual) is vital to meeting the course learning objectives, we understand that extenuating circumstances may arise. Valid excuses for missing class include death or serious illness in the immediate family, illness of the student, and, provided previous notification is given, observance of regularly scheduled religious obligations. Other reasons might include attendance at academic conferences, academic field trips or participation in University-sponsored activities such as debating contests or athletic competitions. All other situations will be handled on a case-by-case basis. If the absence is planned, a written notice (via email) must be submitted to the instructors no less than one week prior to the absence. If the absence is unforeseen, a written explanation must be submitted within one week of returning to school.

Academic Integrity

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-121) . We expect you to know and follow the university's policies on cheating and plagiarism, and the SPH Academic Integrity Policy . Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington Community Standards and Student Conduct

Access and Accommodations

Your experience in this class is important to me. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you have already established accommodations with Disability Resources for Students (DRS), please activate your accommodations via myDRS so we can discuss how they will be implemented in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), contact DRS directly to set up an Access Plan. DRS facilitates the interactive process that establishes reasonable accommodations. Contact DRS at disability.uw.edu .

Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at [Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/)](https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/) . Accommodations must be requested within the first two weeks of this course using the [Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/)](https://registrar.washington.edu/students/religious-accommodations-request/)

Inclusion & Diversity

Diverse backgrounds, embodiments and experiences are essential to the critical thinking endeavor at the heart of University education. In SPH, we are expected:

1. To respect individual differences, which may include, but are not limited to, age, cultural background, disability, ethnicity, family status, gender, immigration status, national origin, race, religion, sex, sexual orientation, socioeconomic status and veteran status.
2. To engage respectfully in the discussion of diverse worldviews and ideologies embedded in course readings, presentations and artifacts, including those course materials that are at odds with personal beliefs and values.
3. To encourage students with concerns about classroom climate to talk to their instructor, adviser, a member of the departmental or SPH EDI Committee, the Assistant Dean for EDI, or the program's director.

Classroom Climate

We are co-creators of our learning environment. It is our collective responsibility to develop a supportive learning environment for everyone. Listening with respect and an open mind, striving to understand others' views, and articulating your own point of view will help foster the creation of this environment. We engage our differences with the intent to build community, not to put down the other and distance our self from the other. Being mindful to not monopolize discussion and/or interrupt others will also help foster a dialogic environment.

The following guidelines can add to the richness of our discussion:

- We assume that persons are always doing the best that they can, including the persons in this learning environment.
- We acknowledge that systematic oppression exists based on privileged positions and specific to race, gender, class, religion, sexual orientation, and other social variables and identities.
- We posit that assigning blame to persons in socially marginal positions is counter-productive to our practice. We can learn much about the dominant culture by looking at how it constructs the lives of those on its social margins.
- While we may question or take issue with another class member's ideology, we will not demean, devalue, or attempt to humiliate another person based on her/his experiences, value system, or construction of meaning.
- We have a professional obligation to actively challenge myths and stereotypes about our own groups and other groups so we can break down the walls that prohibit group cooperation and growth.
  [Adapted from Lynn Weber Cannon (1990). Fostering positive race, class and gender dynamics in the classroom. *Women Studies Quarterly, 1 & 2, 126-134*.]

We are a learning community. As such, we are expected to engage with difference. Part of functioning as a learning community is to engage in dialogue in respectful ways that supports learning for all of us and that holds us accountable to each other. Our learning community asks us to trust and take risks in being vulnerable.

Here are some guidelines that we try to use in our learning process:

- LISTEN WELL and be present to each member of our group and class.
- Assume that I might miss things others see and see things others miss.
- Raise my views in such a way that I encourage others to raise theirs.
- Inquire into others' views while inviting them to inquire into mine.
- Extend the same listening to others I would wish them to extend to me.
- Surface my feelings in such a way that I make it easier for others to surface theirs.

- Regard my views as a perspective onto the world, not the world itself.
- Beware of either-or thinking.
- Beware of my assumptions of others and their motivations.
- Test my assumptions about how and why people say or do things.
- Be authentic in my engagement with all members of our class.

Pronouns

We share our pronouns because we strive to cultivate an inclusive environment where people of all genders feel safe and respected. We cannot assume we know someone's gender just by looking at them. So we invite everyone to share their pronouns.

Bias Concerns

The Office of the Dean has a [student concern policy](#), a faculty concern policy and standard HR procedures for staff concerns. Our 2018 climate survey states that most people in SPH do not report bias incidents because they do not know where to go. Students are encouraged to report any incidents of bias to someone they feel comfortable with, including instructors, advisers or department staff. They can email dcinfo@uw.edu for immediate follow up. Bias concerns can be anonymously and confidentially reported at this link https://sph.washington.edu/about/diversity/bias-concerns. Data is collected by the Assistant Dean for EDI and the Director of Program Operations for Student and Academic Services and tracked for resolution and areas are identified for further training.

Sexual Harassment

Sexual harassment is a form of harassment based on the recipient's sex that is characterized by:

1. Unwelcome sexual advances, requests for sexual favors, or other verbal or physical conduct of a sexual nature by a person who has authority over the recipient when:

- Submission to such conduct is an implicit or explicit condition of the individual's employment, academic status, or ability to use University facilities and services, or
- Submission to or rejection of the conduct affects tangible aspects of the individual's employment, academic status, or use of University facilities.
- Unwelcome and unsolicited language or conduct that creates an intimidating, hostile, or offensive working or learning environment, or has the purpose or effect of unreasonably interfering with an individual's academic or work performance.

If you believe that you are being harassed, or have observed harassment, you can report it to SPH using the [bias concerns link](). The University also has designated offices to help you: [SafeCampus](); [Office of the Ombud](); [Title IX Investigation Office](); and [University Complaint Investigation and Resolution Office]()

Mental Health and Wellness

Your time in this course and at UW should be challenging not overwhelming. Support for you is available and all students are encouraged to learn about the many options available to promote wellness. Counseling and other mental health services can be accessed through the [UW Counseling Center]()

UW has partnered with *My SSP* to give students access to real-time, confidential mental health and crisis intervention support, 24/7 and in multiple languages. There are several ways to connect:

- **Phone:** Call 1.866.775.0608
  - (If calling from outside the US or Canada, dial **001.416.380.6578**).
- **Online chat:** Chat with a My SSP counselor on [the My SSP website]() or on the My SSP app ([Apple App Store]() | [Google Play]())