

# Environmental Fate and Impact of Pollutants in Soil and Water Syllabus

ENR 5273 Spring 2023

## Course Information

- **Course times and location:** Tuesdays and Thursdays, 9:35 a.m.-10:55 a.m. , 103 Kottman Hall
- **Credit hours:** 3
- **Mode of delivery:** In person

## Instructor

- **Name:** Nicholas Basta
- **Email:** [basta.@osu.edu](mailto:basta.@osu.edu)
- **Phone Number:** 614-208-7280
- **Office location:** 410C Kottman Hall
- **Office hours:** by appointment
- **Preferred means of communication:**
  - My preferred method of communication for questions is **email**.
  - My class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your [notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to be sure you receive these messages.

## Teaching Assistant

- **Name:** Margaret Borders
- **Email:** [borders.52@buckeyemail.osu.edu](mailto:borders.52@buckeyemail.osu.edu)
- **Course Prerequisites:** One term of introductory chemistry (e.g. Chem 1110 or Chem 1210) or graduate student standing

## Course Description

An overview of contaminant sources, transport through soil and water, and of environmental fate and impact of contaminants to human and ecosystem receptors. Topics include assessment and remediation of soil and water contaminants.

## Learning Outcomes

By the end of this course, students should successfully be able to:

- Understand the source, transport and human and ecological exposure of physical, chemical and pathogenic contaminants
- Use basic environmental fate concepts and use them to predict contaminant fate (e.g. fugacity).
- Calculate transport of contaminants through water, soil, and air media.
- Understand environmental transport and fate for key emerging contaminants (e.g. PFAS, pharmaceuticals), contemporary contaminants (e.g. agricultural chemicals), and legacy contaminants (e.g. PCB, heavy metals including lead)
- Describe remediation options for contaminants in the environment

## How This Course Works

**Mode of delivery:** This course is in person. The rest of your work is found in Carmen.

**Credit hours and work expectations:** This is a 3 credit-hour course. According to [Ohio State bylaws on instruction](https://go.osu.edu/credithours) (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 3 hours of homework (problem sets, topical briefs).

### Computer and Tablet Use Policy

Open computers and surfing distract other students and is unprofessional. However, computers / tablets for class notes is acceptable. NO computers /tablet or phone use permitted during exams.

## Required Materials and/or Technologies

- Class notes and other supplementary materials will be available on the class Carmen page.

## Recommended/Optional Materials and/or Technologies

- Environmental and Pollution Science. 3rd edition. 2019. Mark L. Brusseau. Ian L. Pepper, Charles P. Gerba. ISBN 978-0-12-814719-1. Academic Press, Elsevier.
- Chemical Fate and Transport in the Environment. 3rd edition. 2014. Harold F. Hemond and Elizabeth J. Fechner. ISBN 978-0-12-398256-8. Elsevier.

## Fees and/or Additional Requirements

- None

## Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.
- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for [technology and internet access](https://go.osu.edu/student-tech-access) (go.osu.edu/student-tech-access).

## Required Software

**Microsoft Office 365:** All Ohio State students are now eligible for free Microsoft Office 365. Visit the [installing Office 365](https://go.osu.edu/office365help) (go.osu.edu/office365help) help article for full instructions.

## CarmenCanvas Access

You will need to use [BuckeyePass](https://buckeyepass.osu.edu) (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](https://go.osu.edu/add-device) (go.osu.edu/add-device) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes, good for 365 days, that can each be used once.
- [Install the Duo Mobile application](https://go.osu.edu/install-duo) (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at [614-688-4357 \(HELP\)](tel:614-688-4357) and IT support staff will work out a solution with you.

## Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** [go.osu.edu/it](https://go.osu.edu/it)
- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** [servicedesk@osu.edu](mailto:servicedesk@osu.edu)

# Grading and Faculty Response

## EXAMINATIONS AND GRADING

Undergraduate and graduate students are graded separately

### Undergraduate Student Grading

Assignment Category	Points
2 examinations @ 20 each	40
Final examination	20
Topical briefs, 3 @ 8.3 each	25
Problem sets, 3 @ 5 each	15

### Graduate Student Grading

Assignment Category	Points
2 examinations @ 20 each	40
Final examination	20
Problem sets, 3 @ 5 each	15
Topical briefs, 3 @ 5 each	15
Oral presentation	10

See [Course Schedule](#) for due dates.

## Descriptions of Major Course Assignments

Problem sets will be posted on Carmen. Students will complete problem sets and upload to Carmen

### **Topical Briefs:**

The course is divided into three subject material sections. After the completion of each section you will be asked to find a current news article relating to a topic in the section subject material. This article can be of something that is of interest to you and should be from a reputable news source or scientific journal (i.e. CNN, USA Today, Science, Scientific American, local news outlets, etc.). After reading the article write a brief describing how what was discussed in class relates to the article that you found.

Briefs will be turned in on Carmen via Drop Box along with a copy of the article that you found. Briefs not submitted to the Dropbox by the due date will not be accepted and result in a grade of zero. Sometimes extenuating circumstances occur and accommodations can be made on a case by case basis. Accommodations will only be made if the instructor is notified prior to the due date of the brief.

Criteria for a Satisfactory briefs

- a. Submitted to the Dropbox on time (10%)
- b. Include a copy of the article that was used (10%)
- c. Using an article from a reputable news or scientific source (10%)
- d. Relate topics discussed in class to the article (i.e. key principles, equations, how you would approach this problem if you faced it in the future, etc.) see following section. (70%)

Late reports will be penalized 10%/day.

The format of the topical brief will be:

**Cover page:** title, your name, date

**Background:** Introduce the environmental issue. Include sources of the contaminant, the scope of the problem—local or global, environmental concern including ecological and human impacts.

**Transport and Fate:** Briefly discuss the relevant fate and transport pathways. Make sure to discuss both transport pathways and exposure pathways to humans or an ecological receptor. For this portion, discuss any applicable equations that could be used to analyze the transport of this contaminant. How might someone calculate transport of this contaminant?

**Solution to the issue:** Briefly discuss potential solutions to the issue, including potential remediation etc. What research is being done to solve this issue? How have people attempted to address this issue?

**References:** cite all literature reviewed in the research paper.

Examples of the format for a topical brief will be provided in Carmen.

## Problems Sets

Problem sets will be completed by students out of class. Due dates will be posted. Completed problem sets will be uploaded into designated dropbox on Carmen. Problem sets will be graded on completion of individual problems. Problem set keys will be issued afterwards.

**Academic integrity and collaboration:** Your written assignments, including discussion posts, should be your own original work.

## Late Assignments

Please refer to Carmen for due dates. Due dates are set to help you stay on pace and to allow timely feedback that will help you complete subsequent assignments. Points will be deducted for later reports.

## Instructor Feedback and Response Time

[Example: I am providing the following list to give you an idea of my intended availability throughout the course. Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical problem.

- **Preferred contact method:** If you have a question, please contact me first through my Ohio State email address. I will reply to emails within **24 hours on days when class is in session at the university**.
- **Class announcements:** I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Grading and feedback:** For assignments submitted before the due date, I will try to provide feedback and grades within **seven days**. Assignments submitted after the due date may have reduced feedback and grades may take longer to be posted.]

## Grading Scale

93–100: 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+  
60–66.9: D  
Below 60: E

## Other Course Policies

### Discussion and Communication Guidelines

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

### Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's [Code of Student Conduct](http://studentconduct.osu.edu) (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

**If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct.** If COAM determines that you have violated the university's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.



Other sources of information on academic misconduct (integrity) to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)
- [Ten Suggestions for Preserving Academic Integrity](http://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](http://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

## Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

## Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at [equity.osu.edu](http://equity.osu.edu),
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email [equity@osu.edu](mailto:equity@osu.edu)

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.

- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member."

This course adheres to The Principles of Community adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://studentlife.osu.edu/bias/report-a-bias-incident.aspx>.

## Your Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, [on-demand mental health resources](https://go.osu.edu/ccsondemand) ([go.osu.edu/ccsondemand](https://go.osu.edu/ccsondemand)) are available. You can reach an on-call counselor when CCS is closed at [614- 292-5766](tel:614-292-5766). **24-hour emergency help** is available through the [National Suicide Prevention Lifeline website](https://www.suicidpreventionlifeline.org) ([suicidepreventionlifeline.org](https://www.suicidpreventionlifeline.org)) or by calling [1-800-273-8255\(TALK\)](tel:1-800-273-8255). [The Ohio State Wellness app](https://go.osu.edu/wellnessapp) ([go.osu.edu/wellnessapp](https://go.osu.edu/wellnessapp)) is also a great resource.

# Accessibility Accommodations for Students with Disabilities

## Requesting Accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with [Student Life Disability Services \(SLDS\)](#). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's [request process](#), managed by Student Life Disability Services.

## Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: [slds.osu.edu](http://slds.osu.edu)
- Email: [slds@osu.edu](mailto:slds@osu.edu)
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

## Statement on Title IX

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassed or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at [titleix.osu.edu](http://titleix.osu.edu) or by contacting the Ohio State Title IX Coordinator at [titleix@osu.edu](mailto:titleix@osu.edu). Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit [equity.osu.edu](http://equity.osu.edu) or email [equity@osu.edu](mailto:equity@osu.edu).

## Commitment to a diverse and inclusive learning environment

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined

as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

## Course Schedule (tentative, subject to change)

Refer to the CarmenCanvas course for up-to-date due dates.

Week	Points	Topics, Readings, Assignments, Due Dates
1		Introduction to class; Types of pollution
2		Contaminant partitioning, environmental chemistry constants, fugacity Physical, chemical, and microbiological fate and transport processes
3		Physical, chemical, and microbiological fate and transport processes Atmospheric pollution
4		Surface and ground water contaminant transport
5		Risk Assessment / environmental laws; review problem set 1
6		Exam 1; surface water pollution
7		Agricultural nutrient pollution (N, P)
8		Soil and water pollution: pesticides, toxic organic chemicals
9		Soil and water pollution: pesticides, toxic organic chemicals
10		Environmental pollution: radioactivity and shale fracking
11		review problem set 2; Exam 2
12		Environmental pollution: metal(oids), rare earth metals, As, Pb, Hg, etc
13		Emerging contaminants: pharmaceuticals/personal care products Emerging contaminants: polyfluoroalkyl substances (PFAS)
14		Emerging contaminants: polyfluoroalkyl substances (PFAS) Graduate student presentations
15		Graduate student presentations