**ENVH 440 and 540: Water, Wastewater, and Health**

Fall Quarter, 2024

Tues/Thurs, 2:00-3:20

Room: HSEB 345

**INSTRUCTORS:**

**Kelsey Jesser**, Clinical Research Assistant Professor (she, her, hers)

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Phone: 206-543-4341 (email preferred)

Office Hours: By appointment

*Note that Dr. Jesser will be on maternity leave through late October*

**John Scott Meschke,** Professor (he, him, his)

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Email: [jmeschke@uw.edu](mailto:jmeschke@uw.edu)

Phone: 206-221-5470

Office Hours: By appointment

**TEACHING ASSISTANT:**

**Gioia Skeltis-Robinson,** (she, her, hers)

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Office Hours: By appointment

**COURSE DESCRIPTION**

This course will review the various aspects of domestic and global water and wastewater systems as they relate to human health. Topics covered will include source water, basic treatment technologies for water and waste, chemical contaminants, microbial contaminants, and recreational water. This course will be of use for public health professionals, microbiologists, civil and environmental engineers, and environmental scientists.

**COURSE OBJECTIVES**

On completion of this course, all students should be able to:

1. Identify and describe regulatory frameworks pertaining to water and wastewater.
2. Recognize, characterize, and categorize waterborne contaminants, their sources, and health effects.
3. Summarize and discuss centralized treatment approaches for water and wastewater.
4. Identify and describe decentralized alternatives for water and wastewater treatment.
5. Demonstrate and discuss the impacts of water on personal and community health.

Additionally, graduate students should be able to:

1. Critically review the scientific and gray literature on water and wastewater issues,
2. Compare and contrast alternative solutions to water and wastewater problem scenarios, and
3. Outline, recommend, and justify available solutions.

**ACCREDITATION REQUIREMENTS & DEGREE COMPETENCIES MET BY THIS COURSE**

N/A

**REQUIRED TEXTBOOK AND READINGS**

There is no required text for this course. Reading assignments and course materials will be provided through Canvas.

**GRADING & ASSESSMENT**

For the sake of this class, letter and numerical grades will typically be distributed according to the university grading scale between the following standards:  
A (4.0) = Excellent and exceptional work (typically >>95% of available points)  
D (1.0) = Deficient work (typically <66% of available points)  
It is expected that most students will perform at a level of ~3.5.

See table below for detailed list of assignments and assessments that will be used to determine student grades in the course.

**LATE ASSIGNMENT POLICY**

Late assignments may be penalized 10% of point value for each class period that they are late.

**EXCUSED ABSENCE FROM CLASS**

Students are expected to attend class and to participate in all graded activities, including midterms and final examinations. A student who is anticipating being absent from class due to a Religious Accommodation activity needs to complete the Religious Accommodations request process by the second Friday of the quarter. Students who anticipate missing class due to attendance at academic conferences or field trips, or participation in university sponsored activities should provide a written notice to the instructor ahead of the absence. The instructor will determine if the graded activity or exam can be rescheduled or if there is equivalent work that can be done, as determined by the instructor.

To protect student privacy and the integrity of the academic experience, students will not be required to provide a medical excuse note to justify an absence from class due to illness. A student absent from any graded class activity or examination due to illness must request, in writing, to take a rescheduled examination or perform work judged by the instructor to be the equivalent.

**STUDENT RESPONSIBILITIES**

Students are expected to be prepared for class and participate in classroom discussions, complete assignments, and be respectful of fellow students, instructors, and guest speakers. Students should communicate with instructors about any difficulties, concerns, or absences during the term.

**SESSION-BY-SESSION SCHEDULE**

Details on the course schedule can be found below and are also available on Canvas in the Modules.

**ILLNESS PROTOCOL**

If you feel ill or exhibit respiratory or other symptoms, you should not come to class. Seek medical attention if necessary and notify your instructor(s) as soon as possible by email. Follow the [COVID-19 Public Health Flowchart](https://www.ehs.washington.edu/system/files/resources/COVID-19-public-health-flowchart.pdf) if you have COVID-19 symptoms, exposure or test positive, and adhere to the [UW Face Covering Policy](https://www.ehs.washington.edu/covid-19-prevention-and-response/face-covering-policy).

Additional recommendations include getting your [annual flu shot](https://wellbeing.uw.edu/flu-vaccination/) and getting boosted with the updated COVID vaccines (available [at clinics and pharmacies, as well as through UW Medicine](https://www.washington.edu/coronavirus/vaccines/)and local health agencies).

Please check your email and CANVAS announcements daily BEFORE coming to class. If we need to conduct class remotely because the instructor or a guest speaker is unable to attend in person, we will send all registered students an email and/or post a CANVAS announcement with a Zoom link for remote instruction or a plan for making up the class.

**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/).

**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](https://depts.washington.edu/uwdrs/).

**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, unauthorized use of artificial intelligence (AI) tools, and other misconduct are serious violations of the University of Washington [Student Conduct Code (WAC 478-121)](https://apps.leg.wa.gov/WAC/default.aspx?cite=478-121). We expect you to know and follow the university's policies on cheating and plagiarism, and the [SPH Academic Integrity Policy](https://sph.washington.edu/students/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](https://www.washington.edu/cssc/).

**USE OF GENERATIVE ARTIFICIAL INTELLIGENCE (AI) IN COURSEWORK**

Certain assignments in this course direct you to use AI tools for specific purposes and with specific directions. On those assignments, you may use AI tools as directed. On all other assignments, you are not permitted to turn in any work that is created, completely or partially, by AI tools or another AI tool.

**WRITING SKILLS**

Effective communication through writing is an important transferable skill for all career pathways. Establishing a strong foundation in writing skills will help you be successful throughout your future course work and career. This course includes written assignments with the goal of helping you get feedback on and improve your writing skills. If, however, you feel that you could benefit from additional resources to improve you writing skills, a list of UW and other online resources can be found on the [SPH website](https://sph.washington.edu/sites/default/files/inline-files/Writing-Resources-4.3.19.pdf) (links to an external site) and on the [DEOHS intranet](https://portal.deohs.washington.edu/index.php/academic-support-writing-resources) (links to an external site- accessible only to DEOHS students).

**LAND ACKNOWLEDGMENT**

Washington state is home to 29 federally recognized and multiple unrecognized tribes. We include a land acknowledgment statement as a sign of respect for the original caretakers of the land: “We acknowledge the Coast Salish people of this land, the land which touches the shared waters of all tribes and bands within the Duwamish, Suquamish, Tulalip and Muckleshoot nations."

**CLASSROOM CLIMATE**

The UW School of Public Health seeks to ensure all students are fully included in each course. We strive to create an environment that reflects community and mutual caring. We encourage students with concerns about classroom climate to talk to your instructor, your faculty or academic advisor, or a member of the departmental or SPH Diversity Committee. Victoria Gardner ([vg@uw.edu](mailto:vg@uw.edu)), SPH Assistant Dean for Equity, Diversity & Inclusion, is also a resource for students with concerns related to equity, diversity, and inclusion.

**EQUITY, DIVERSITY AND INCLUSION**

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.

**PRONOUNS**

The University of Washington supports the expression of all gender identity, and provides frequently asked question on pronouns at the following link: <https://registrar.washington.edu/students/personal-data/pronouns/faqs/>. UW staff, faculty, and students can now also set their pronouns in the Identity.UW system to make them automatically available in Canvas and other UW systems (see <https://itconnect.uw.edu/guides-by-topic/identity-diversity-inclusion/identity/pronouns>).

We share our pronouns because we strive to cultivate an inclusive environment where people of all genders feel safe and respected. We invite everyone to share their pronouns. Professor Jesser uses [she, her, hers] pronouns. Professor Meschke uses [he, him his] pronouns.

**LEARNING ENVIRONMENT**

The Department of Environmental and Occupational Health Sciences (DEOHS) strives to create welcoming and respectful learning environments that promote access and opportunity for all students, regardless of their experiences, perspectives, identities, and abilities. The DEOHS, along with The UW School of Public Health, seek to ensure all students are fully included in each course. We strive to create an environment that reflects community and mutual caring. Students are encouraged to talk to instructors, advisors, members of the departmental or SPH Diversity Committee and/or program director with concerns about the classroom climate.

If you feel like this class is not living up to that commitment, there are several ways you can register your concern and seek resolution:

* If you feel comfortable doing so, begin by discussing your concern with the instructor and/or teaching assistant. Your instructor is expected to take your concerns seriously and work with you to identify a resolution.
* If you are not comfortable discussing the concern with the instructor, or you did so and the issue has still not been resolved, contact Trina Sterry, DEOHS Manager of Student and Academic Services ([tsterry@uw.edu](mailto:tsterry@uw.edu)) to discuss your concern. She can also connect you to the appropriate member of DEOHS faculty leadership as needed.
* If you prefer to discuss your concern directly with someone from the School of Public Health (SPH) Dean’s Office, you can review [the SPH Student Concern Policy](https://sph.washington.edu/students/student-concern-policy) and follow the procedures described there, including reaching out to the SPH Assistant Dean for Equity, Diversity and Inclusion, Dr. Victoria Gardner ([vg@uw.edu](mailto:vg@uw.edu)). If you prefer to anonymously report your concern, you can email [dcinfo@uw.edu](mailto:dcinfo@uw.edu) or use [the SPH Bias Incident Report Form](mailto:https://sph.washington.edu/about/diversity/bias-concerns).
* If your concern is related to a bias incident, you can review [the UW’s guidance on reporting bias incidents](https://www.washington.edu/bias/), which includes a link to the UW Bias Reporting Tool.
* If you have experienced sex or gender discrimination, including sexual assault, relationship or intimate partner violence, stalking, sexual harassment, or other sexual misconduct, you have the right to make a formal complaint and request an investigation under Title IX. Information about Title IX reporting options is available at <https://www.washington.edu/titleix/report/>. The University also has other designated offices to help you avoid and/or report sexual harassment: SafeCampus (<https://www.washington.edu/safecampus/>); Office of the Ombud (<https://www.washington.edu/ombud/>); and University Complaint Investigation and Resolution Office (<https://www.washington.edu/uciro/>).

**Bias Concerns**

The Office of the Dean has a [student concern policy](https://sph.washington.edu/students/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](mailto:dcinfo@uw.edu )for immediate follow up. Bias concerns can be anonymously and confidentially reported via the online form found here: <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.
2. 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](https://sph.washington.edu/about/diversity/bias-concerns). The University also has designated offices to help you: [SafeCampus](https://www.washington.edu/safecampus/); [Office of the Ombud](https://www.washington.edu/ombud/); [Title IX Investigation Office](https://www.washington.edu/titleix/report/); and [University Complaint Investigation and Resolution Office](https://www.washington.edu/compliance/uciro/).

**GRADING:**

Points will be available according to the following percentage breakdown:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Undergraduate** | **Graduate** |  |
| **Item** | **% of Grade** | **% of Grade** | **Notes** |
| **Intro assignment** | 2% | 2% | Video introduction – who you are, why you are taking the course, and where your water comes from now or when you were growing up |
| **Quizzes** | 21% | 14% | Quiz assignments will cover lectures, reading, and pre-recorded lectures. Quizzes covering the prior week’s material will open on Thursdays at 3:30pm and be due before class on the following Tuesday. |
| **Midterm** | 20% | 20% | The midterm exam will consist of short answer and multiple choice questions. The exam will be given online and will be open book and open note, but students should not consult with any other people while answering the questions. |
| **Group Discussions** | 20% | 10% | Students are expected to participate in group discussion and learning activities. These will consist of journal clubs, *In the News* activities and attendance/report back for one session of the UNC Water and Health Conference. |
| **Questions for guest lecturers** | 4% | 4% | Students are expected to submit questions for the speaker at least 24 hours in advance of each of the guest lectures. |
| **Policy Assignment** | 10 | 10% | Students are expected to review the Bipartisan Infrastructure Act and propose how Seattle/King County should prioritize funds to improve the water system. |
| **Applied scenario project** | 3% | 20% | **440 students:** Undergraduates are expected to attend graduate student presentations and formulate 5 questions for the speaker.  **540 students:** Graduate students will develop short presentation (5-7 minutes) that includes a critical review of the relevant literature and potential solutions to a specific scenario (of their choosing), in which health has been impacted by waterborne contaminants. Presentations will be made in person unless other arrangements are needed for an online presentation. Graduate students will present and respond to questions on their presentation during the last week of class. |
| **Final Exam** | 20% | 20% | The final exam will be offered during finals week.  The final exam will be a similar format to the midterm exam, and will be comprehensive of all material covered in the course, weighted more heavily to material covered since the midterm. Exam will be given online and will be open book and open note, but students should not consult with any other people while answering the questions. |

**COURSE SCHEDULE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day of Week** | **Date** | **Topic** | **Speaker/Lead** | **In-class Activity** | **Homework** |
| Thurs | 9/26 | **Introduction/Welcome/ Overview of Syllabus** | Meschke | Video:  <https://crosscut.com/video/deeply-rooted/tale-two-waters> | -Video introduction  -Reading/pre-recorded lecture for 10/1 |
| Tues | 10/1 | **Water Regulation & Water Rights** | Meschke | In-class report-back on where your water comes from (from video introduction) | -Complete any readings/view pre-recorded lecture for 10/3  -Disc. topic response |
| Thurs | 10/3 | **Microbial contaminants** | Meschke | Discussion topic:  Microbial contaminants | -**Quiz 1** by 10/10 (online, covers 10/1 + 10/3)  -Readings and questions for Dr. Levy  -Research new PFAS rules |
| Tues | 10/8 | **Guest Lecture: Waterborne disease epidemiology** | Levy | Guest lecture, discussion with speaker  Discussion topic: new PFAS rule | - Complete any readings/view pre-recorded lecture for 10/10  -In the News 1 response |
| Thurs | 10/10 | **Water sources + access, groundwater** | Meschke | Discussion Topic: In the News 1 | -**Quiz 2** by 10/17 (online, covers 10/8 + 10/10)  -Readings and questions for Dr. Easterberg |
| Tues | 10/15 | **Guest Lecture: Hot tubs and pools** | Easterberg | Guest lecture, discussion with speaker | - Complete any readings/view pre-recorded lecture for 10/17  -Attend Water & Health conference (runs 10/14-10/18) |
| Thurs | 10/17 | **Water Chemistry + chemical contaminants** | Meschke | Discussion topic:  Emerging contaminants | -**Quiz 3** by 10/24 (online, covers 10/15 + 10/17)  - Complete any readings/view pre-recorded lecture for 10/22 |
| Tues | 10/22 | **Water treatment processes** | Meschke | Discussion topic: How water sources dictate treatment | -Readings and questions for Dr. Levy  -Conference report-back |
| Thurs | 10/24 | **Guest Lecture: Global water quality + sanitation overview** | Levy | Guest lecture, discussion with speaker  Discussion topic: UNC Water & Health conference report-backs | -**Quiz 4** by 10/31 (online, covers 10/22 + 10/24)  - Complete any readings/view pre-recorded lecture for 10/29 |
| Tues | 10/29 | **Distribution systems + cross connections** | Meschke | Preliminary meetings with policy project groups | - Complete any readings/view pre-recorded lecture for 10/31 |
| Thurs | 10/31 | **Centralized/Decentralized wastewater treatment** | Meschke | Discussion topic: Comparison of centralized vs. decentralized wastewater treatment  Midterm review | -Study for Midterm! (covers 10/3 – 10/31)  -Readings and questions for Drs. Schoen and Mitchell |
| 10/31-11/5 | | **MIDTERM (online)**  (Covers all material from the first half of the class) | | | |
| Tues | 11/5 | **Guest lecture: QMRA** | Schoen/ Mitchell | Guest lecture, discussion with speaker | - Complete any readings/view pre-recorded lecture for 11/7 |
| Thurs | 11/7 | **Industrialized pre-treatment** | Meschke | Discussion topic: Policy assignment with groups | - Complete any readings/view pre-recorded lecture for 11/12  -Prepare infrastructure policy presentations  -**Quiz 5** by 11/14 (online, covers 11/5 & 11/7) |
| Tues | 11/12 | **PFAS rule policy presentations** | Meschke/  Jesser | Student policy presentations | - Complete any readings/view pre-recorded lecture for 11/4  -In the News 2 response |
| Thurs | 11/14 | **Global WASH epidemiology** | Jesser | Discussion topic: In the News 2  Midterm debrief | -Questions for Maya Lubeck-Shriker  -**Quiz 6** by 11/22 (online, covers 11/12 & 11/14) |
| Tues | 11/19 | **Guest lecture: SOIL** | Lubeck-Schriker | Guest lecture, discussion with speaker | - Complete any readings/view pre-recorded lecture for 11/22 |
| Thurs | 11/22 | **Wastewater epidemiology** | Meschke/  Jesser | Discussion topic:  TBD | - Complete any readings/view pre-recorded lecture for 11/26 |
| Tues | 11/26 | **Agricultural water** | Jesser | Discussion topic:  What’s on your Thanksgiving table? | -Readings and questions for Paulina Lopez  -**Quiz 7** by 12/3 (online, covers 11/19 + 11/22 + 11/26) |
| Thurs | 11/28 | **THANKSGIVING** | n/a | n/a |  |
| Tues | 12/3 | **Guest lecture: Duwamish River** | Lopez | Guest lecture, discussion with speaker  Final review | -Final presentation (ENVH 540)  -Questions for grad student presenters  (ENVH 440) |
| Thurs | 12/5 | **Student presentations** | ENVH540 students | ENVH 540 final presentations | -Study for Final exam! |
| 12/9-12/12 | | **FINAL EXAM (online)**  (Covers all material from entire class, with more emphasis on 2nd half) | | | |