

ENVH 440 and 545: Water, Wastewater, and Health

Fall Quarter, 2019

Monday, Wednesday, & Friday, 11:30-12:20

Room: HSB T435

INSTRUCTORS: John Scott Meschke
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OFFICE HOURS: By Appointment

COURSE DESCRIPTION:

This course will review the various aspects of water and wastewater 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 explain the major applicable laws and regulations of the United States pertaining to water and wastewater.
2. Recognize, characterize, and categorize waterborne contaminants, their sources, and health effects.
3. Summarize and discuss major conventional treatment classes 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.

TEXTS AND REFERENCES:

There is no required text for this course. Reading assignments and course materials will be provided through Canvas. The following texts are recommended references for this course:

Books (may be borrowed from instructor)-

Disinfection, Sterilization and Preservation, 5th edition, LWW

Metcalf and Eddy's Wastewater Engineering: Treatment and Reuse, McGraw-Hill

Water Quality and Treatment, 5th edition, AWWA

Water Technology, 3rd Edition, IWA Publishing

Journals (available online through UW libraries)-

Journal of American Water Works Association

Water Science and Technology

Water Research

Environmental Science and Technology

CLASS PARTICIPATION:

Although class attendance is not expressly required, students will be expected to participate in classroom discussion and in-class group activities. Students will not have the opportunity to earn class participation credit for course periods during which they are absent.

COURSE FORMAT:

The course will be divided primarily into 3 modules: Waterborne Contaminants, Water Treatment, and Wastewater Treatment. Additional material will be presented on Water Law and Regulation, and Recreational Water. Modules will consist of lectures, group discussions, and learning activities on related topics.

GRADING OPPORTUNITIES:

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.

Graduate Students (545):

Points will be available according to the following percentage breakdown:

Curriculum Vitae (5%): Each student is required to provide a 1-2 page CV describing the student's background and interests. CVs will be due by the third class period.

Homework (20%): Students will have the opportunity to complete 2 homework assignments, totaling 20% of the overall grade. Homework assignments will be due as indicated on the course outline. Late assignments may be penalized 10% of point value for each class period that they are late.

Midterm Exam (20%): The midterm exam will be given on the 2nd of November. It will consist primarily of short answer questions, but may include multiple choice and fill-in the blank questions as well. Exam will be open book and open note.

Class Participation (10%): Students will be expected to participate in group discussion and learning activities. Participation in group activities will be evaluated by peer evaluation.

Applied Scenario Project (25%): Graduate students will work in teams of two to develop an annotated bibliography, critical review of the relevant literature, and a brief presentation on solutions to a specific scenario in which health has been impacted by waterborne contaminants. Graduate students will present their findings to the class in the last week of class.

Final Exam (20%): The final exam will be offered online at the end of the quarter during finals week. Final exam will be comprehensive and will consist of short answer, multiple choice, true/false-explain, and problem solving questions. Exam will be open book and open note.

Undergraduate Students (440):

Points will be available according to the following percentage breakdown:

Curriculum Vitae (5%): Each student will be required to provide a 1-2 page CV describing the student's background and interests. CVs will be due by the third class period.

Homework (30%): Students will have the opportunity to complete 2 homework assignments, each worth 15 % of the overall grade. Homework assignments will be due as indicated on the course outline. Late assignments will be penalized 10% of point value for each class period that they are late.

Midterm Exam (25%): The midterm exam will be given on the 2nd of November. It will consist primarily of short answer questions, but may include multiple choice and fill-in the blank questions as well. Exam will be open book and open note.

Class Participation (15%): Students may earn class participation credits by participating in classroom discussions (asking and answering questions) and answering extra-credit questions (via email).

Final Exam (25%): Final exam will be offered online at the end of the quarter during finals week. Final exam will be comprehensive and will consist of short answer, multiple choice, true/false-explain, and problem solving questions. Exam will be open book and open note.

Access and Accommodations

Your experience in this class is important to me. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs 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 are not limited to mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

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-accommodatio...) (<https://registrar.washington.edu/staffandfaculty/religious-accommodatio...>). 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-requ...) (<https://registrar.washington.edu/students/religious-accommodations-requ...>).

Safety

Call SafeCampus at 206-685-7233 anytime – no matter where you work or study – to anonymously discuss safety and well-being concerns for yourself or others. SafeCampus's team of caring professionals will provide individualized support, while discussing short- and long-term solutions and connecting you with additional resources when requested.

SPH Land Acknowledgment

The University of Washington acknowledges 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.

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 478-120). 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 website.

Equity, Diversity and Inclusion

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

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.

COURSE RULES

1. Come to class; please let me know ahead of time if you cannot make it.
2. Arrive on time
3. Turn in assignments on time
4. Come to class prepared (keep up with reading)
5. Be courteous (No newspapers, audible cell phones, PDAs, beepers)
6. Food and drinks are welcome (but keep it quiet)
7. Refrain from unnecessary talking, but ASK QUESTIONS
8. Try to remain awake (at least no snoring please)
9. Let me know how I am doing (if I am moving too fast, not being clear, or otherwise not getting the message across, I need to know.)

Date	Day	Lecture Topic	Lecturer	Homework Assignment
25-Sep	W	Introduction/History of Water and Waste Treatment	Meschke	
27-Sep	F	Water Law and Regulation/Water Rights	Meschke	
Waterborne Contaminants Module				
30-Sep	M	Water Microbiology/Microbial Contaminants I	Meschke	
2-Oct	W	Microbial Contaminants II	Meschke	CV Due
4-Oct	F	Water Chemistry/Chemical Contaminants I	Meschke	Homework 1 Available
7-Oct	M	Group Discussion: Microbial Contamination Sources		
9-Oct	W	Group Discussion: Flooding impacts on Water Quality and Health		
11-Oct	F	Chemical Contaminants II	Meschke	
Water Treatment Module				
14-Oct	M	Conventional Municipal Drinking Water Treatment	Zhou	
16-Oct	W	Groundwater	Meschke	
18-Oct	F	Wells-Introduction/Types/Components	Meschke	Homework 1 Due
21-Oct	M	Group Discussion: PFOA/PFAS water contamination		
23-Oct	W	Drinking Water Disinfection	Meschke	
25-Oct	F	Advanced Drinking Water Treatment Processes/Distribution Systems	Meschke	
28-Oct	M	Group Discussion: Water Scarcity and Water Access		
30-Oct	W	Group Discussion: Drinking Water in Developing Countries		Midterm - Online
1-Nov	F	Cross Connection Issues/Contamination of Drinking Water	Easterberg	
Wastewater Treatment Module				
4-Nov	M	Introduction to Wastewater Treatment/Collection Systems/Combined Sewer Overflow	Meschke	
6-Nov	W	Conventional Municipal Waste Treatment	Zhou	
8-Nov	F	On-Site Waste Disposal Systems I	Meschke	
11-Nov	M	NO CLASS - Veterans Day		
13-Nov	W	On-Site Waste Disposal Systems II	Meschke	
15-Nov	F	Industrial Waste Treatment	Meschke	
18-Nov	M	Group Discussion: Sanitation in the Developing World		Homework 2 Available
20-Nov	W	Group Discussion: Aging Infrastructure		
22-Nov	F	Disposal and Treatment of Biosolids/Septage	Meschke	
25-Nov	M	Graywater and Water Reuse	Meschke	
27-Nov	W	Shellfish and Recreational Water: Natural Waters	Meschke	
29-Nov	F	Thanksgiving Break		
2-Dec	M	Recreational Water: Pools and Hot Tubs (Meet at IMA)	Easterberg	Homework 2 Due
4-Dec	W	Graduate Student Presentations		
6-Dec	F	Graduate Student Presentations		

Final Exam - Online