

**ENV H 451/541**  
**Environmental & Occupational Health Microbiology I: Ecology of**  
**Environmentally Transmitted Microbial Hazards**

Autumn Quarter 2019

Monday, Wednesday, and Friday, 12:30-1:20 pm

Room: HST T435

**INSTRUCTOR:** John Scott Meschke  
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**OFFICE HOURS:** By Appointment

**COURSE WEBSITE:** <https://canvas.uw.edu/courses/1320268>

**COURSE DESCRIPTION:**

This course will review environmentally transmitted pathogens with respect to their sources and occurrence, mobility, and fate in the environment. This course will be of use for public health and health care professionals, microbiologists, civil and environmental engineers, environmental scientists and bio-defense specialists.

**COURSE OBJECTIVES:**

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

1. Recognize and describe the major classes of environmentally transmitted pathogens and other microbiological hazards;
2. Distinguish infectious disease epidemiology from other types of epidemiology;
3. Recognize and assess exposure pathways and routes of transmission;
4. Outline and distinguish the factors affecting the persistence, fate and mobility of microbial hazards in environmental media; and
5. Summarize and discuss relevant research articles on environmental transmission of microbiological hazards.

In addition, graduate students should be able to:

1. Identify and define factors in an exposure scenario that may affect risk from microbiological hazards.
2. Critically review and interpret the scientific and gray literature on microbiological hazards,
3. Effectively communicate (in oral and written manner) their knowledge of environmental transmission of microbiological hazards.

**TEXTS AND REFERENCES:**

There is no required text for this class. Readings and course materials will be available

through Canvas. The following texts are recommended references for more in-depth detail on course topics:

Books-

Manual of Environmental Microbiology 4<sup>th</sup> edition (ed. Yates et al., ASM Press)  
Disinfection, Sterilization and Preservation, 5<sup>th</sup> edition, LWW  
Metcalf and Eddy's Wastewater Engineering: Treatment and Reuse, McGraw-Hill  
Water Quality and Treatment, 5<sup>th</sup> edition, AWWA  
Bioaerosols Handbook, Lewis  
Food Microbiology, Doyle  
Any Basic Microbiology Text (e.g. Madigan, Martinko and Parker; Prescott, Harley and Klein; etc.)

Journals-

Journal of Applied Microbiology  
Letters in Applied Microbiology  
Applied and Environmental Microbiology  
Journal of American Water Works Association  
Journal of Food Protection  
International Journal of Food Microbiology  
Water Science and Technology  
Water Research  
Emerging Infectious Disease

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

**COURSE FORMAT:** Class periods will be an interactive lecture format or will be dedicated to student-led discussion.

**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.

**Undergraduate Student**

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 (20%): Students will have the opportunity to complete 2 homework assignments, each worth 10% 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 (25%): Midterm exam will consist primarily of short answer questions, but may include multiple choice and fill-in the blank questions as well. Exams will be conducted online. Exam will be open book and open note. Early or make-up exams will only be offered in case of emergencies or prior arrangement with instructor. Formats for early and make-up exams are left to the discretion of instructor.

Class Participation (15%): Participation credit may be earned by participating in classroom activities and discussions. Additionally, participation-credit questions may be asked in class for email response. Participation in group learning activities will be evaluated by quality of group presentation.

Pathogen Profile (10%): Students will have the opportunity to complete a pathogen profile for their “pet bug”. These will be a 5-10 page single spaced review of the transmission of their chosen organism by environmental routes.

Final Exam (25%): Final Exam will be offered on **ONLINE 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.

## **Graduate Student**

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 (20%): Students will have the opportunity to complete 2 homework assignments. 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%): Midterm exam will consist primarily of short answer questions, but may include multiple choice and fill-in the blank questions as well. Exams will be conducted during a scheduled course period. Exam will be open book and open note. Early or make-up exams will only be offered in case of emergencies or prior arrangement with instructor. Formats for early and make-up exams are left to the discretion of instructor.

Class Participation (10%): Participation credit may be earned by participating in group discussions and classroom activities. Additional participation credit questions may be asked in class for email response.

Pathogen Profile (15%): Students have the opportunity to complete a pathogen profile for their “pet bug” and report it in class. These will be a 5-10 page single spaced review of their chosen organism and an oral presentation.

Final Exam (25%): Final Exam will be offered **ONLINE during finals week**. Final exam will be comprehensive and will consist of short answer 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](mailto:uwdrs@uw.edu) or [disability.uw.edu](http://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...).

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## **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.

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## **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](mailto: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 try to 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
8. ASK QUESTIONS
9. Try to remain awake (at least no snoring please)
10. 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.)

# ENVH 451/541: Ecology of Environmentally Transmitted Microbiological Hazards

Date	Day	Lecture Topic	Lecturer	Homework Assignment
25-Sep	W	Class Organization and Introduction	Meschke	
<b>Microbial Contaminants and Infectious Disease Epidemiology Module</b>				
27-Sep	F	Principles of Infectious Disease Epidemiology	Meschke	
30-Sep	M	Bacteria	Meschke	CV Due/Pathogen Profile Rubric Available
2-Oct	W	Fungi/Algae	Meschke	
4-Oct	F	Protozoa	Meschke	
7-Oct	M	Viruses/Prions	Keim	HW#1 Available
9-Oct	W	Vector-borne Disease	Meschke	Prep for Discussion
11-Oct	F	Group Discussion: Emerging Infectious Diseases	Keim	
14-Oct	M	Helminthes	Meschke	
16-Oct	W	Zoonotic Disease and One Health	Meschke	
18-Oct	F	Microbial Toxins	Meschke	
<b>Waterborne and Water-Related Disease Module</b>				
21-Oct	M	Waterborne and Water-Related Disease	Meschke	
23-Oct	W	Fate and Transport of Microbes in Water	Meschke	Prep for Discussion
25-Oct	F	Group Discussion: Factors affecting microbial exposure from water	Meschke	HW#1 Due
<b>Bioaerosol and Airborne/Droplet Transmission Module</b>				
28-Oct	M	<b>MIDTERM EXAM</b>	Meschke	
30-Oct	W	Airborne Transmission of Microbial Hazards	Meschke	
1-Nov	F	Fate and Transport of Microbes in Air	Meschke	Prep for Discussion
4-Nov	M	Group Discussion: Airborne versus Droplet Spread	Meschke	
<b>Surface Associated Transmission Module</b>				
6-Nov	W	Fomites in Transmission of Infectious Agents	Meschke	
8-Nov	F	Fate and Transport of Microbes on Surfaces	Meschke	HW#2 Available
11-Nov	M	NO CLASS - Veterans Day		
13-Nov	W	Group Discussion: Public Surfaces as Vehicles of Disease	Meschke	Prep for Discussion
<b>Micorbial Hazars in Food Module</b>				
15-Nov	F	Micorbial Hazards in Food	Meschke	
18-Nov	M	Fate and Transport of Microbes in Food	Mazengia	Prep for Discussion
20-Nov	W	Group Discussion: Food Preparation and Cross Contamination	Meschke/Keim	Draft Pathogen Profiles Due
<b>Microbial Communities Module</b>				
22-Nov	F	Indicators and Microbial Source Tracking	Meschke	
25-Nov	M	Polymicrobial Diseases	Meschke	HW#2 Due
27-Nov	W	Antimicrobial Resistance	Meschke	Prep for Discussion
29-Nov	F	NO CLASS - Thanksgiving Break		Pathogen Profile Drafts Returned
2-Dec	M	Group Discussion: Microbiome and Obesity	Meschke	
4-Dec	W	Grad Student Presentation of Pathogen Profile	Meschke	
6-Dec	F		Meschke	
<b>FINAL EXAM</b>				<b>Final Pathogen Profile Due</b>