

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

Autumn Quarter 2018

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

Room: Health Sciences Building D209

INSTRUCTOR: John Scott Meschke
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OFFICE HOURS: By Appointment

COURSE WEBSITE: <https://canvas.uw.edu/courses/1220763>

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, and

TEXTS AND REFERENCES:

The recommended text for this course is Environmental Microbiology 3rd edition (Pepper, Gerba, and Gentry, Academic Press). Additional Readings and course materials will be available

through the course webpage or handed out in class. The following texts are recommended references for more in-depth detail on course topics:

Books-

Manual of Environmental Microbiology 4th edition (ed. Yates et al., ASM Press)
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
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 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 (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. th

Final Exam (25%): Final Exam will be offered on **December 13th from 8:30-10:20 am**. 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 on **December 13th from 8:30-10:20 am**. Final exam will be comprehensive and will consist of short answer and problem solving questions. Exam will be open book and open note.

Academic Integrity (<http://sph.washington.edu/students/academicintegrity/>)

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.*

Access and Accommodation (<http://depts.washington.edu/uwdrs/faculty-resources/syllabus-statement/>):

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 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.

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.)

Date	Day	Lecture Topic	Lecturer	Homework Assignment
26-Sep	W	Class Organization and Introduction	Meschke	
Microbiological Contaminants and Infectious Disease Epidemiology Module				
28-Sep	F	Principles of Infectious Disease Epidemiology	Meschke	
1-Oct	M	Bacteria	Meschke	CV Due/Pathogen Profile Rubric Available
3-Oct	W	Fungi/Algae	Meschke	
5-Oct	F	Protozoa	Meschke	
8-Oct	M	Viruses/Prions	Keim	HW #1 Available
10-Oct	W	Group Discussion: Emerging Infectious Diseases	Keim	
12-Oct	F	Vector-borne Disease	Meschke	Prep for Discussion
15-Oct	M	Helminthes	Meschke	
17-Oct	W	Zoonotic Disease and One Health	Meschke	
19-Oct	F	Microbial Toxins	Meschke	
Waterborne and Water-related Disease Module				
22-Oct	M	Waterborne and Water-Related Disease	Meschke	
24-Oct	W	Fate and Transport of Microbes in Water	Meschke	Prep for Discussion
26-Oct	F	Group Discussion: Factors affecting microbial exposure from water	Meschke	HW#1 Due
Bioaerosol and Airborne/Droplet Transmission Module				
29-Oct	M	MIDTERM EXAM	Meschke	
31-Oct	W	Airborne Transmission of Microbial Hazards	Meschke	
2-Nov	F	Fate and Transport of Microbes in Air	Meschke	Prep for Discussion
5-Nov	M	Group Discussion: Airborne versus Droplet Spread	Meschke	
Surface Associated Transmission Module				
7-Nov	W	Fomites in Transmission of Infectious Agents	Meschke	
9-Nov	F	Fate and Transport of Microbes on Surfaces	Meschke	HW#2 Available
12-Nov	M	NO CLASS - Veterans Day		
14-Nov	W	Group Discussion: Public Surfaces as Vehicles of Disease	Meschke	Prep for Discussion
Microbial Hazards in Food Module				
16-Nov	F	Microbial Hazards in Food	Meschke	
19-Nov	M	Fate and Transport of Microbes in Food	Mazengia	Prep for Discussion
21-Nov	W	Group Discussion: Food Preparation and Cross Contamination	Meschke/Keim	Draft Pathogen Profiles Due
23-Nov	F	NO CLASS - Thanksgiving Break		
Microbial Communities Module				
26-Nov	M	Indicators and Microbial Source Tracking	Meschke	
28-Nov	W	Polymicrobial Diseases	Meschke	HW#2 Due
30-Nov	F	Antimicrobial Resistance	Meschke	Prep for Discussion
3-Dec	M	Group Discussion: Microbiome and Obesity	Meschke	Pathogen Profile Drafts Returned
5-Dec	WF	Grad Student Presentation of Pathogen Profile	Meschke	
7-Dec		Grad Student Presentation of Pathogen Profile	Meschke	
13-Dec	Th	FINAL EXAM 8:30-10:20 am		Final Pathogen Profile Due