

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

Autumn Quarter, 2007
Monday, Wednesday, and Friday, 12:30-1:30
Room: Fisheries Teaching & Research 034

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OFFICE HOURS: By Appointment

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 will be able to:

1. Recognize the major classes of environmentally transmitted pathogens and describe specific examples for each class in different environmental media;
2. Discuss the major epidemiological elements of environmentally transmitted infectious disease;
3. Summarize the major exposure pathways and routes of transmission;
4. Compare and contrast the different types of microbiologically relevant foodborne disease;
5. Discuss factors that affect occurrence, growth, and persistence of microbiologic agents and by-products in food;
6. Outline and distinguish the factors affecting the persistence, fate and mobility of microbial hazards in water;
7. Discuss the trends in waterborne disease;
8. Identify and describe factors affecting transmission of microbiological agents by surfaces;
9. Summarize fomite and sharps-based transmission of infectious agents;
10. Demonstrate an understanding of occupationally relevant exposures to microbiological hazards;

11. Identify and describe factors affecting the airborne transmission of microbiological hazards;
12. Categorize the different mechanisms of antimicrobial resistance and factors affecting their development;
13. Define and contrast zoonotic and vectorborne transmission of microbiological hazards; and
14. Interpret, summarize and discuss relevant research articles on environmental transmission of microbiological hazards.

TEXTS AND REFERENCES:

The recommended texts/references for this course is the Manual of Environmental Microbiology 3rd edition (ed. Hurst et al., ASM Press) and Environmental Microbiology (Maier, Pepper and Gerba, 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 (more will be given during the duration of the course):

Books-

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
Journal of 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 on Monday and Wednesday will be an interactive lecture format. With notable exceptions, Fridays will be largely 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 .

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 second 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 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. Format for early and make-up exams is left to the discretion of instructor.

Class Participation (20%): Participation credit may be earned during Monday and Wednesday session by participating in question answer sessions. Additionally, participation-credit questions may be asked in class for email response. Students will be broken into groups for Friday activities. Participation in group learning activities will be evaluated by quality of group presentation and peer evaluation.

Final Exam (30%): Final Exam will be offered on **December 13th 8:30-10:20**. 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 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 second 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 (30%): 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. Format for early and make-up exams is left to the discretion of instructor.

Class Participation (10%): Participation credit may be earned during Monday and Wednesday session by participating in question answer sessions, or Friday article discussions. Additional participation credit questions may be asked in class for email response.

Final Exam (35%): Final Exam will be offered on **December 13th 8:30-10:20**. Final exam will be comprehensive and will consist of short answer and problem solving questions. Exam will be open book and open note.

ACADEMIC ACCOMODATIONS: To request academic accommodations due to disability, please contact Disabled Student Services, 448 Schmitz, (206) 543-8924 (V/TTY). If you have a letter from Disabled Student Services indicating that you have a disability that requires academic accommodations, please present the letter to me so we can discuss the accommodations you might need in this class.

COURSE RULES

1. Come to class, please try to let me know ahead of time if you can not 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.)