Course Syllabus

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ENV H 409 A / 509 A

Tuesdays & Thursdays, 2:30 to 3:50
HSB T-625

Instructors:

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Course Description

This course will present and review the current science behind understanding microbiome impacts on environmental public health. The course will define human, animal, and environmental microbiomes; describe the methods used to characterize these microbiomes, and discuss the impact of microbiomes on the health and well-being of human and animal populations. The course will also examine factors that have been suggested to modulate microbial populations, host-microbe interactions, and the dynamics of microbiome populations. This course will be of use to public health and health care professionals, microbiologists, civil and environmental engineers, environmental scientists, and those generally interested in understanding the health relevance of news reports on the microbiome.

Learning Objectives

Upon completion of this course, both undergraduate (409) and graduate (509) students will be able to:

1. Recognize and differentiate the composition of human, animal, and environmental microbiomes;
2. Discuss potential interactions between microbiomes;
3. Describe the role of sampling in microbiome studies;
4. Compare and contrast DNA/RNA sequencing approaches to characterize a microbiome;
5. Discuss bioinformatics approaches to characterizing microbiome sequence data;
6. Explain the importance of metadata associated with a published microbiome;
7. Recognize and list functional roles of microbiome in a state of good health and well-being for humans;
8. Outline host-microbiome interactions and functional roles that impact health;
9. Identify and characterize specific disease states (chronic, environmental, and infectious disease) associated with microbiome composition or function;
10. Evaluate the weight of evidence to support connections between microbiome and health;
11. Identify and categorize intrinsic and extrinsic factors that modulate a microbiome;
12. Diagram the relationships between host, microbiome, and environmental factors.

In addition, graduate students (509) will be able to:

13. Critically assess and evaluate the literature on a topic of interest relevant to the course.
14. Synthesize the available research on a microbiome-related topic and develop a comprehensive review for a scientifically literate audience.

Texts and References

There is no text book required to be purchased. Readings and course materials will be drawn from current research and new materials. All readings will be made available through the Canvas course site or handed out in class.

Class Participation

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

Class Format

Class periods will be dedicated to either interactive lectures or student-led discussions and group work. The course will be divided into 4 modules: 1) Characterization of human, animal, and environmental microbiomes, 2) methods for analysis of human, animal, and environmental microbiomes, 3) the role of microbiome on health (e.g. specific disease states, health optimization, drug metabolism, vitamin metabolism, nutrient availability, interaction with immune system), and 4) the impact of the environment, diet, and other factors on modulating the microbiome.

Grading Opportunities

Numerical grades will typically be distributed according to the following scale:

%	GP	%	GP	%	GP
96%	4	86%	3	76%	2
95%	3.9	85%	2.9	75%	1.9
94%	3.8	84%	2.8	74%	1.8
93%	3.7	83%	2.7	73%	1.7
92%	3.6	82%	2.6	72%	1.6
91%	3.5	81%	2.5	71%	1.5
90%	3.4	80%	2.4	70%	1.4
89%	3.3	79%	2.3	69%	1.3
88%	3.2	78%	2.2	68%	1.2
87%	3.1	77%	2.1	67%	1.1
				66%	1

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:

- Reading Comprehension (30%): Students will have the opportunity to complete weekly reading comprehension assignments. Each assignment will consist of a one page explanation of the one or more of the salient points from the week's assigned reading. Assignments should demonstrate an understanding of the material rather than provide a summary of the content.
- Module quizzes (30%): Students will have the opportunity to complete online end of module quizzes. Quizzes will consist of 3-5 questions that must be successfully answered to unlock readings for next module.
- Class Participation (10%): Although students will not be graded on class attendance, students will be expected to participate in classroom discussion and in-class group learning activities for course credit. Students will not have the opportunity to earn class participation credit for course periods during which they are absent.
- Final Exam (30%): A final exam will be offered on (date TBD). The exam will be comprehensive and will consist of short answer multiple choice, true/false-explain, and problem-solving questions. The exam will be open book and open note.

Graduate Student Points will be available according to the following percentage breakdown:

- Reading Comprehension (20%): Students will have the opportunity to complete weekly reading comprehension assignments. Each assignment will consist of a one page explanation of the one or more of the salient points from the week's assigned reading. Assignments should demonstrate an understanding of the material rather than provide a summary of the content.
- Module quizzes (20%): Students will have the opportunity to complete online end of module quizzes. Quizzes will consist of 3-5 questions that must be successfully answered to unlock readings for next module.
- Class Participation (10%): Although students will not be graded on class attendance, students will be

expected to participate in classroom discussion and in-class group learning activities for course credit. Students will not have the opportunity to earn class participation credit for course periods during which they are absent.

- Critical Review (20%): Graduate students will have the opportunity to complete an in-depth (but focused), critical review of the literature on a specific topic relevant to the course. Topics must be approved by the instructors. The review will consist of a 10-page (single spaced, 10 pt Ariel font, 1/2 inch margins) manuscript on the chosen topic. Critical Reviews should show synthesis and evaluation of the peer reviewed literature. Manuscripts must be formatted consistent with the Applied and Environmental Microbiology instructions for authors for a minireview (**http://aem.asm.org/site/misc/ifora.xhtml** (http://aem.asm.org/site/misc/ifora.xhtml)).
- Final Exam (30%): Final Exam will be offered on (date TBD). The final exam will be comprehensive and will consist of short answer and problem solving questions. The exam will be open book and open note.

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 advisor, a member of the departmental or SPH Diversity Committee and/or the program director. **DCinfo@uw.edu** (mailto:DCinfo@uw.edu) is a resource for students with classroom climate concerns.

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 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** (http://depts.washington.edu/uwdrs/) . 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.

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** (http://sph.washington.edu/students/academicintegrity/). 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.

Course Rules

- Come to class, please try to let me know ahead of time if you cannot make it.
- Arrive on time.
- Turn in assignments on time.
- Come to class prepared (keep up with reading).
- Be courteous (no newspapers, audible cell phones, PDAs, beepers).
- Food and drinks are welcome (but keep it quiet).
- Refrain from unnecessary talking.
- ASK QUESTIONS.
- Try to remain awake (at least no snoring please).
- 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.

Session-by-Session Schedule

Please see the **MODULES PAGE** for a complete, session-by-session schedule and to access to all course assignments, etc. All assignments with associated due dates will also automatically appear in chronological order below.

Course Summary:

Date	Details	
Tue Mar 27, 2018	Reading Assignment, Session 1 (Introduction) (https://canvas.uw.edu/courses/1211240/assignments/4130639)	due by 2:30pm
	Microbiome and Environmental Health Concepts (https://canvas.uw.edu/courses/1211240/assignments/4156560)	due by 5pm
Thu Mar 29, 2018	Reading Assignment, Session 2 (Human Microbiome) (https://canvas.uw.edu/courses/1211240/assignments/4130642)	due by 2:30pm
Tue Apr 3, 2018	Reading Assignment, Session 3 (Animal and Plant Microbiomes) (https://canvas.uw.edu/courses/1211240/assignments/4130646)	due by 2:30pm
Wed Apr 4, 2018	Reading Comprehension Assignment - WEEK 1 (https://canvas.uw.edu/courses/1211240/assignments/4189399)	due by 2:30pm

Thu Apr 5, 2018	Reading Assignment, Session 4 (Environmental Microbiomes) (https://canvas.uw.edu/courses/1211240/assignments/4130669)	due by 2:30pm
Tue Apr 10, 2018	Reading Assignment, Session 5 (Molecular Biology Primer; Sampling, Preparation, and Extraction Methods) (https://canvas.uw.edu/courses/1211240/assignments/4130676)	due by 2:30pm
	Reading Comprehension Assignment - Week 2 (https://canvas.uw.edu/courses/1211240/assignments/4218641)	due by 5pm
Thu Apr 12, 2018	Reading Assignment, Session 6 (High Throughput Sequencing Methods) (https://canvas.uw.edu/courses/1211240/assignments/4130691)	due by 2:30pm
Tue Apr 17, 2018	Reading Assignment, Session 7 (Metabolomics) (https://canvas.uw.edu/courses/1211240/assignments/4130693)	due by 2:30pm
	Reading Comprehension Assignment - Week 3 (https://canvas.uw.edu/courses/1211240/assignments/4218683)	due by 5pm
Thu Apr 19, 2018	Reading Assignment, Session 8 (Bioinformatics Pipelines I - Data Management, Databases, Biopipeline frameworks, Assembly, Alignment) (https://canvas.uw.edu/courses/1211240/assignments/4130696)	due by 2:30pm
Tue Apr 24, 2018	Reading Assignment, Session 9 (Bioinformatics Pipelines II - QIIME, PICRUSt, FishTaco, BURRITO, MIMOSA, QIITA, MOTHUR, Nephele, CCREPE, Virome, Virus Seeker) (https://canvas.uw.edu/courses/1211240/assignments/4130699)	due by 2:30pm
	Reading Comprehension Assignment- Week 4 (https://canvas.uw.edu/courses/1211240/assignments/4218689)	due by 5pm
Thu Apr 26, 2018	Reading Assignment, Session 10 (Direct Health Effects - Gut Microbiome) (https://canvas.uw.edu/courses/1211240/assignments/4130784)	due by 2:30pm
Tue May 1, 2018	Reading Assignment, Session 11 (Sequencing Targets, Transcriptomics, and Indirect Health Effects of Microbiome) (https://canvas.uw.edu/courses/1211240/assignments/4130789)	due by 2:30pm
	Reading Comprehension Assignment - Week 5 (https://canvas.uw.edu/courses/1211240/assignments/4218692)	due by 5pm
Thu May 3, 2018	Reading Assignment, Session 12 (early life microbiomes, neurological effects, harmful algae blooms) (https://canvas.uw.edu/courses/1211240/assignments/4130792)	due by 2:30pm
	Reading Comprehension Assignment - Week 6	due by 5pm

Tue May 8, 2018	(https://canvas.uw.edu/courses/1211240/assignments/4218708)	
Thu May 10, 2018	Reading Assignment, Session 13 (Direct Health Effects - Other Microbiomes) (https://canvas.uw.edu/courses/1211240/assignments/4130795)	due by 2:30pm
	Reading Assignment, Session 14 (Indirect Health Effects - Toxin and Pharmaceutic Metabolism) (https://canvas.uw.edu/courses/1211240/assignments/4130794)	due by 2:30pm
Tue May 15, 2018	Reading Assignment, Session 15 (Population Health and One Health) (https://canvas.uw.edu/courses/1211240/assignments/4130810)	due by 2:30pm
	Reading Comprehension Assignment - Week 7 (https://canvas.uw.edu/courses/1211240/assignments/4218712)	due by 5pm
Thu May 17, 2018	Reading Assignment, Session 16 (Diet and Nutrition) (https://canvas.uw.edu/courses/1211240/assignments/4130866)	due by 2:30pm
Tue May 22, 2018	Reading Assignment, Session 17 (Host Factors) (https://canvas.uw.edu/courses/1211240/assignments/4130869)	due by 2:30pm
	Reading Comprehension Assignment - Week 8 (https://canvas.uw.edu/courses/1211240/assignments/4218719)	due by 5pm
Thu May 24, 2018	Reading Assignment, Session 18 (Environmental Factors) (https://canvas.uw.edu/courses/1211240/assignments/4130872)	due by 2:30pm
Thu May 31, 2018	ENV H 409/509 Final Exam (https://canvas.uw.edu/courses/1211240/assignments/4265593)	due by 4:30pm
	2018 ENV H 409A/509A Week 1 Poll Everywhere Quiz (Class Participation) (https://canvas.uw.edu/courses/1211240/assignments/4216529)	
	2018 ENV H 409A/509A Week 2 Poll Everywhere Quiz (Class Participation) (https://canvas.uw.edu/courses/1211240/assignments/4220885)	
	2018 ENV H 409A/509A Week 3 Poll Everywhere (class participation) (https://canvas.uw.edu/courses/1211240/assignments/4231381)	
	2018 ENV H 409A/509A Week 4 Quiz (https://canvas.uw.edu/courses/1211240/assignments/4268793)	
	2018 ENV H 409A/509A Week 5 Quiz (https://canvas.uw.edu/courses/1211240/assignments/4268790)	
	2018 ENV H 409A/509A Week 6 Quiz (https://canvas.uw.edu/courses/1211240/assignments/4268791)	
	2018 ENV H 409A/509A Week 7 Quiz (https://canvas.uw.edu/courses/1211240/assignments/4268792)	

- Module 1 Quiz (https://canvas.uw.edu/courses/1211240/assignments/4222447)
- Module 2 quiz (https://canvas.uw.edu/courses/1211240/assignments/4236517)
- Module 3 Quiz (https://canvas.uw.edu/courses/1211240/assignments/4255532)