

Microbiology 375: The Microbiome of Plants, Animals, and Humans
SYLLABUS for Spring 2017
MWF 11:00 am – 11:50 am
3 Credits
Room 1420 Microbial Sciences Building

Welcome to Microbiology 375, The Microbiome of Plants, Animals, and Humans. The focus of this course is on the microbial communities associated with eukaryotic hosts. The content covered includes both beneficial and pathogenic interactions between microbes and their eukaryotic hosts: plants and animals including humans.

Instructor

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Prerequisites: Microbiology 303 or equivalent

Course format. The course consists of 41 lectures spread over 16 weeks. Lectures will be given generally as PowerPoint presentations. Lecture slides will be posted in PDF format shortly after each lecture. There is no textbook for the course. Reading or viewing materials will be available through Learn@UW.

Examples of learning outcomes

1. Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.
2. Human impact on the environment influences the evolution of microbial communities
3. Microbial communities, eukaryotic hosts, and their environment interact with and modify each other.
4. Microorganisms can interact with plant and animal (including human) hosts in beneficial, neutral or detrimental ways.
5. Microbial communities are essential for life as we know it and the processes that support life.
6. Because the true diversity of microbial life is largely unknown, its effects and potential benefits have not been fully explored.

Textbook

No textbook. Course material will also be provided as PDF files of readings and PowerPoint presentations. **These materials are the property of the University of Wisconsin and are for your personal use only.** You are not allowed to repost/upload them in any form to any web site. Doing so will be considered academic misconduct.

Learn@UW

The course Learn@UW site will be used to post files of lecture presentations, reading assignments, and other materials and to post grades.

Participation

We will be using the Top Hat (www.tophat.com) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or via text message (SMS). You can visit <http://tinyurl.com/THStudentRegistration> for the Student Quick Start Guide which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system. An email invitation will also be sent to your email account (if you don't receive this email, you can register by visiting our direct Top Hat course URL tophat.com/e/XXXXXX).

Top Hat will require a subscription. There are three options to choose from:

- \$16 for 4 months of unlimited access
- \$20 for 12 months of unlimited access
- \$54 for lifetime* access

Reading assignments

Readings will be assigned 6 times during the course. Reading material will be posted on Learn@UW. Reading will be tested during the Midterm and Final Exams.

Exams

The mid-term and final exams will be based on lecture material and assigned readings (see following table). This includes all the material that is covered by the instructors during class.

- The Midterm Exam 1 covers material from lectures 1-12 and assigned readings #1 and 2, and counts for 20% of the final grade.
- The Midterm Exam 2 covers material from lectures 13-25 and assigned readings #3 and 4, and counts for 20% of the final grade.
- The Final Exam covers all the material from lectures 1-41 and all 6 assigned readings (cumulative from the beginning), and counts for 40% of the final grade for undergraduate students and 30% of the grade for graduate students.

Exams will be a combination of short-answer and multiple choice questions.

Office hours

There are two office hours every week: Tuesday and Wednesdays: 11 AM – 11:50 AM in Prof. Ané's office (5303 Microbial Sciences Building)

Additional meeting times by appointment only: contact Prof. Ané (jeanmichel.ane@wisc.edu)

Graduate student project

Graduate students will be provided with the research project on their own microbiome during the 1st lecture of the class. Graduate students will need to write a report on this project due before lecture #41. This project will count for 10% of the grade of graduate students.

Final grade

For undergraduate students, scores from exams will contribute to the final grade as follows:

Top Hat Participation	10%
Midterm Exam 1 (lectures 1-9)	20%
Midterm Exam 2 (lectures 1-16)	20%
Final Exam (lectures 1-28)	40%
Total:	100%

For graduate students, scores from exams will contribute to the final grade as follows:

Top Hat Participation	10%
Project	10%
Midterm Exam 1 (lectures 1-9)	20%
Midterm Exam 2 (lectures 1-16)	20%
Final Exam (lectures 1-28)	30%
Total:	100%

Letter grades for the course will be based on the cumulative percentage as calculated above and assigned as follows:

A: $\geq 92\%$

AB: $\geq 87\%$ but $< 92\%$

B: $\geq 82\%$ but $< 87\%$

BC: $\geq 77\%$ but $< 82\%$

C: $\geq 72\%$ but $< 77\%$

D: $\geq 60\%$ but $< 72\%$

F: $< 60\%$

Week	Date	Lecture	Topic	Assigned reading
1	1/18/2017	1	Introduction to Microbiology 375	
	1/20/2017	2	Introduction to microbiomes	
2	1/23/2017	3	Introduction to microbiomes	#1
	1/25/2017	4	Bacterial pathogenesis	
	1/27/2017	5	Fungal pathogenesis	
3	1/30/2017	6	Bacterial symbioses	
	2/1/2017	7	<u>Invited Speaker: Anne Pringle</u>	
	2/3/2017	8	Fungal symbioses	
4	2/6/2017	9	Responses of animals to the microbiome	#2
	2/8/2017	10	Responses of animals to the microbiome	
	2/10/2017	11	Responses of plants to the microbiome	
5	2/13/2017	12	Responses of plants to the microbiome	
	2/15/2017	13	Methodologies to study the microbiome	

	2/17/2017	14	Methodologies to study the microbiome	
6	2/20/2017		Midterm Exam 1 (lectures 1-12 + reading 1-2)	
	2/22/2017	15	Conducting a microbiome study	
	2/24/2017	16	<u>Invited Speaker: Garret Suen</u>	
7	2/27/2017	17	Microbiome acquisition	#3
	3/1/2017	18	Microbiome and Animal Life Cycle	
	3/3/2017	19	Microbiome and Plant Life Cycle	
8	3/6/2017	20	Connections between microbial communities	
	3/8/2017	21	Microbiome and Animal Nutrition	
	3/10/2017	22	Microbiome and Plant Nutrition	
9	3/13/2017	23	Microbiome and Animal Health	#4
	3/15/2017	24	Microbiome and Plant Health	
	3/17/2017	25	<u>Invited Speaker: Thea Whitman</u>	
10	3/20/2017		SPRING BREAK	
	3/22/2017		SPRING BREAK	
	3/24/2017		SPRING BREAK	
11	3/27/2017		Midterm Exam 2 (lectures 13-25 + reading 3-4)	
	3/29/2017	26	Niche Theory and Microbial Diversity	
	3/31/2017	27	Island Biogeography Theory	
12	4/3/2017	28	Neutral Theory and Microbial Diversity	#5
	4/5/2017	29	Selection and drift	
	4/7/2017	30	Dispersal and diversification	
13	4/10/2017	31	Loss of microbiome ecological niches	
	4/12/2017	32	Multi-trophic interactions	
	4/14/2017	33	<u>Invited Speaker: Federico E. Rey</u>	
14	4/17/2017	34	Functional diversity vs. structural diversity	#6
	4/19/2017	35	Co-evolution between hosts and microbiome	
	4/21/2017	36	<u>Invited Speaker: Cameron Currie</u>	
15	4/24/2017	37	Effects of human interventions	
	4/26/2017	38	Ethics in microbiome studies	
	4/28/2017	39	Hype in microbiome research	
			Commercial products from probiotics to biocontrol agents	
16	5/1/2017	40		
	5/3/2017	41	<u>Invited Speaker from a local microbial product company</u>	
17	TBD		Final Exam (1-41 + reading 1-6)	

EXPECTATIONS

The following expectations are to enhance your ability to learn in this class, to avoid disruption and distraction, and to improve the quality of the classroom experience. Repeated failure to meet these expectations may result in a lower grade for the course.

Entering/Exiting Class:

- Please arrive on time to class and stay for the entire class period. Late arrivals and early departures are disruptive.
- If despite your best effort you arrive late, please quietly take a seat at the back of the classroom. Similarly, in the rare event that you must leave class early (e.g. for a medical appointment), email your instructor in advance to let him/her know, then sit close to the rear door and leave as unobtrusively as possible. If you can't be there on time or must always leave early because of a class or work conflict, either seek specific permission from instructor or do not take the class.
- During exams, ask permission before leaving to use the restroom. Try to use the restroom before coming to class.

Noise:

- When class begins, please stop your conversations.
- Wait until class is completely over before putting your materials away in your backpack, standing up, or talking to friends.

Electronic Devices:

- No taping, filming, or photography in class without prior permission from instructors (whether by camera, cell phone, or other means). These activities are distracting and inhibiting to faculty and other students, may infringe upon privacy or copyright, and have a chilling effect on classroom discussion.
- Cell phones should be turned off. No talking on cell phones, text messaging, or emailing on laptops during class. Wait until after class to return any calls received.
- No listening to iPods or other electronic devices during class.

Email Etiquette:

- You are expected to write as you would in any professional correspondence. Email communication should be courteous and respectful in manner and tone. Do not send emails that are curt or demanding.
- Do not expect an immediate response via email (normally, a response will be sent within two business days).

Participation:

- Keep on the topic at hand. If you have questions off the current topic, address these outside of class at office hours or by email with the instructor.
- Do not talk out of turn. Wait to be recognized before speaking and do not try to

dominate a discussion with your questions or comments – give others a fair opportunity to participate.

Common Courtesy:

- Food and drink are discouraged in class.
- Show respect for the instructors and fellow classmates. Do not interrupt anyone speaking. It is okay to disagree with an idea but not okay to ridicule or make fun of another person and his/her ideas. Raised voices, derogatory language, name-calling, and intimidating behavior will NOT be tolerated.
- Do not disturb others by engaging in disruptive behavior. Disruption interferes with the learning environment and impairs the ability of others to focus, participate, and engage.