

Microbiology 450
Evolution, Ecology, and Diversity of Microbes

Tues, Thurs 9:30-10:45, MSB room 1420, Spring Semester 2015, 2 credits

Instructor information:

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Course goals: This course is designed to provide students in microbiology exposure to fundamental concepts in ecology and evolutionary biology (EEB). UW-Madison is a leader in the biological sciences, with dozens of departments spanning diverse fields of biology and hundreds of tenure-track faculty. Within the biological sciences, UW-Madison is nationally recognized as a leader in the fields of microbiology, ecology and evolutionary biology. Despite the importance of microbes in shaping communities and ecosystems, two fundamental aspects of EEB, these two sub-disciplines of biology lack real integration. This course is designed to expose undergraduate students majoring in microbiology to ecological and evolutionary theory, specifically as how it relates to microbes.

Curriculum: This course will cover three broad areas: i) the underlying principles of phylogenetics and phylogenetic diversity of microscopic organisms, ii) the interaction of microbes with their biotic and abiotic environment and how ecological theory can inform on the field of microbial ecology, and iii) the evolution of microbes and key principles of evolutionary theory.

Marking scheme:

Midterm I (Oct. 2nd): 25%

Midterm II (Nov. 6th): 25%

Final (Dec. 27th): 35%

Assignments: (TBD) combined 15%

Class Assignments: There are 3 assignments due during the course, each worth 5% of your final grade. Please show up to class **on time** to hand in the assignment, as we may go over the answers during the class period. Late assignments will not be accepted.

Date	Tuesday	Thursday
<u>Week 1.</u> Jan 20, 22	Intro (FR-KV)	Microbiome (FR)
<u>Week 2.</u> Jan 27, 29	Phylogenetics (CC)	Phylogenetics (CC)
<u>Week 3.</u> Feb 3, 5	Evolutionary Processes I (KV)	Evolutionary Processes II (KV)
<u>Week 4.</u> Feb 10, 12	Population genetics I (KV)	Population genetics II (KV)
<u>Week 5.</u> Feb 17, 19	Speciation (KV)	Coevolution (KV)
<u>Week 6.</u> Feb 24, 26	Midterm I	Cooperation and conflict (KV)
<u>Week 7.</u> March 3, 5	Strategies for Fluctuating Environments (KV)	Competitive Exclusion and Mechanisms for Diversity (KV)
<u>Week 8.</u> March 10, 12	Community Ecology (KV)	Ecosystems Ecology (KV)
<u>Week 9.</u> March 17, 19	Ecophysiology (FR)	Applied Microbial Ecology (FR)
<u>Week 10.</u> March 24, 26	Symbiosis I (FR)	Symbiosis II (FR)
<u>Week 11.</u> April 7, 9	Midterm II	Domains (FR)
<u>Week 12.</u> April 14, 16	Thai professors	Archaea (FR)
<u>Week 13.</u> April 21, 23	Eubacteria I (FR)	Eubacteria II (FR)
<u>Week 14.</u> April 28, 30	Protists (FR)	Fungi (CC)
<u>Week 15.</u> May 5, 7	Microbiome II (FR)	Final