

Exploring Microbial Diversity

Course Number: MCB 529 - EMD

Credit Hours: 2

Instructors: Dr. Rachel Whitaker and Dr. William Metcalf

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Meeting Place and Time:

Class: In person lab sessions: Teaching Lab IGB 606 Gatehouse Ground Level

Time: Tuesday and Thursday 1:00 – 2:20. Starting August 23.

Whitaker office hours: Monday 11:00

<https://illinois.zoom.us/j/7157315228>

Password = 470606

Course website: Moodle MCB 529-EMD

Course Summary: Although microbes are essential to every ecosystem less than 1% of the diversity of microbes from the natural world are in culture in the lab. This laboratory-based course will teach students how to design culturing strategies to target and grow microbes from natural systems. We focus as an example on microbes associated with plants (clover) and animals (bees) from the long-term ecological research site called the [Kellogg Biological Research](#) station LTER.

Learning Objectives: A successful student in MCB529 will learn to:

- Design selective media based on literature review of specific microbial metabolism.
- Enrich for microorganisms using sterile technique and lab culture.
- Identify microorganisms using microscopy and 16S rRNA sequence

Readings:

Manual on Modular Media Approach to Design and Enrichment and Isolation of Environmental Microbes
Literature on physiology and metabolism of target organism.

Evaluations: Grade is based literature-based design of selective strategy and media recipe (25 pts).
Final group presentation (25 pts). Attendance and participation (50 pts).

Schedule:

Tuesday		Thursday	
August 24 th	<i>No class</i>	August 26 th	<i>No class</i>
August 31 st	Basics of Microbial Growth	September 2 nd	Designing Selective Media
September 7 th	Introduction to GEMS <i>Pseudomonas syringae</i> and plants	September 9 th	<i>Bombella apis</i> and honeybees Legumes and rhizobia
September 14 th	<i>Streptomyces</i> Ecology and evolution of microbial communities	September 16 th	Introduction to microbiology lab techniques
September 21 st	Sampling: honeybees Sampling: Kellogg Biological Research Center	September 23 rd	Initial enrichments
September 28 th	Continue enrichments	September 30 th	Introduction to Microscopy
October 5 th	Continue enrichments	October 7 th	16s sequencing
October 12 th	DNA extractions	October 14 th	DNA extractions II
October 19 th	Final streak plate, Troubleshooting	October 21 st	Make frozen stocks
October 26 th	Catch-up and interactions	October 28 th	Interactions II
November 2 nd	Analysis I – PCR, microscopy	November 4 th	Analysis II – PCR, microscopy
November 9 th	QIIME and bioinformatics	November 11 th	Applied PCR and microscopy
November 16 th	Sequence Analysis I	November 18 th	Sequence Analysis II
November 23 rd	<i>Fall break</i>	November 25 th	<i>Fall break</i>
November 29 th	Group work	December 2 nd	Group work
December 7 th	Group presentation		

Other dates:

December 8th: Last day of instruction

December 9th: reading day