

Schedule for Microbial Physiology ESE/Bi 166 - Fall 2019

Instructor:

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Lecture	Topic
M 9/30	
W 10/2	Introduction to microbes & growth media
F 10/4	<i>Growth Medium Design & Project Discussion</i>
M 10/7	Pure cultures & growth: growth rate vs. yield; batch vs chemostat culture
W 10/9	Cell ultrastructure and composition
F 10/11	Carbon oxidation and fermentation – [<i>decide on projects substrate with Leadbetter & Lim by end of day, confirmed with email.</i>]
M 10/14	More carbon oxidation & fermentation
W 10/16	Membrane energetics and solute transport – [<i>write up medium design due</i>]
F 10/18	Respiration and electron transport
M 10/21	Oxygenases
W 10/23	Special project - design presentations
F 10/25	Special project - design presentations
M 10/28	Ammonia assimilation and nitrification
W 10/30	Nitrate reduction & diazotrophy [<i>Midterms handed out</i>]
F 11/1	S anabolism
M 11/4	P anabolism [<i>Midterms handed in by 9AM today</i>]
W 11/6	Photosynthesis
F 11/8	Iron anabolism
M 11/11	Motility and behavior
W 11/13	Symbiosis
F 11/15	Symbiosis
M 11/18	Quorum Sensing
W 11/20	Secondary metabolism
F 11/22	Bacterial Development: Myxobacteria & <i>Bdellovibrio</i>
M 11/25	Bacterial Development: <i>Caulobacter</i> and non-canonical morphologies
W 11/27	Endospore formation
F 11/29	Thanksgiving Holiday
M 12/2	Isotope fractionation and incorporation
W 12/4	Microbial stress responses [<i>Note: last day for any lab work</i>]
F 12/6	Special project - poster presentations

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Attendance, current events quizzes, & participation: 10%:

“Current events” quizzes will occur nearly every class, and be worth a cumulative 10% of the final grade. The quizzes will require your casual daily perusal of the *Microbes and More* page at *Science Daily*. Every morning this term, you should review the top headlines at this site. Perhaps even make it the default homepage on one of your browsers.

https://www.sciencedaily.com/news/plants_animals/microbes_and_more/

On a regular basis, I will ask a simple question in class about one of the MICROBE CENTERED stories listed under “Latest Headlines” towards the top of the web page. For example, if a recent article highlighted at the site had a headline that discussed an aspect of bacterial motility, I might ask: “**There was a headline recently that focused on a structure/component of the bacterial flagellum. In one word, what was the structure?**”

<https://www.sciencedaily.com/releases/2019/09/190930114805.htm>

The answer would be “**HOOK**”. The idea is that you should be touching base with current topics in the microbial sciences on a daily basis this term. Ideally you might read the entire press releases and some of these articles in greater detail, and might even start asking questions, but I am merely asking here that you follow and peruse this web page every day.

These quizzes will be graded as 2 pts each, one point for your name, one point for the answer, and an average will be determined at the end of the term.

Exams:

The mid-term and final exam will both be cumulative and each worth 10% of the final grade. They will be “take home” in format, kept to 2 hours, and will be closed book. Any other policies for the exams will be included on the cover page of each exam.

Special project:

The special project is worth 30% of the final grade. Start thinking about it **NOW!** *Note: a poster must be presented on the final day of classes to receive any credit, and must contain project results.*

- Students should consult with the professor and TA about their substrate choice *prior* to Friday Oct 11.
- Written design of growth medium (5% of final grade). Due by Wednesday 4PM, October 16th.
- Oral presentation of medium design (5% of final grade). Presentations on Oct. 21 & 23 (random order).
- Construct, inoculate, & monitor medium; isolate strains, document ability to grow on substrate of interest (12.5% of final grade). Medium construction and inoculation week Oct. 14-18; project completion by Wednesday Dec. 4th.
- Present results in the form of a poster presentation (7.5%). Presentations on Friday Dec. 6.

Homework:

5 Homework sets will be assigned and each will be worth 8% of the final grade.

Collaboration is permitted for understanding and discussing all problem sets. But each student must understand and write their own submission in their own words. Substantive reading will be involved.

Note: for grading purposes, credit must be received on all sets for credit to be received on any one set. **This has implications!**

Reading & Resources:

All students must sign up for a login to **Biocyc**, access to which should be free from Caltech internet access points. We will refer to information on this site on a regular basis. <https://biocyc.org/>

Reviews, papers, and articles will also be handed out periodically.

Optional Textbook for background reading “Brock - Biology of Microorganisms 14th Edition” by Madigan et al. 2015 (this can be purchased inexpensively and is never a bad idea to have on the shelf)