

Advanced Microbial Genetics 607 - 2015 Syllabus

Microbio607 is a graduate level Microbial Genetics course. The topics are selected from classical and modern microbial genetic and genomic methods that were/are employed to reveal insights into the central dogma, mutagenesis, the cell cycle, horizontal gene transfer, microbial development and microbial-host interaction. The class will meet two times a week. The class format will be a combination of discussions, lectures, student presentations, grant writing and grant peer panels. The focus of the course is on primary data papers and reviews, critical evaluation of conflicting ideas, comprehension of the logic behind experiments, and familiarization with genetic methods and interpretation of data. The students will also learn how to develop a research topic into a proposal. In summary, this is a “**method and logic**” course as opposed to memorizing “**facts**” from textbooks.

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Prerequisites: It is assumed that students enrolled in this course have the basic knowledge of the following concepts (all of them will be covered in the course):

- DNA, RNA and protein structure, including nucleotides and amino acids.
- Genes, ORFs, promoters, terminators, operons.
- DNA replication, transcription, translation.
- Mutants, mutagenesis, complementation, suppression.
- Transformation, plasmids, transposons, bacteriophages.

Textbooks: This class does NOT have a required textbook. A required reading list consisting of data papers, reviews and study questions will be available at Learn@UW ahead of the lecture. For additional background information, please refer to Introduction to Genetic Analysis by Griffiths, Wessler, Carroll and Doebley.

Lectures: I will do relatively little (<20%) formal lecturing. Instead, there will be reading assignments and the lectures will largely be: 1. Question-and-answer discussions that elaborate on the readings. 2. Student presentations of papers (you will be asked to present one paper among a list of twenty papers during this course).

Home works: There will be one homework assignment every week for seven weeks. Completed homework assignments can be turned in any time before Monday 7pm to the Dropbox at Learn@UW. Most homework questions are based on the reading assignments you received Tuesday last week, and we will go through most questions on Tuesday lectures. No make-ups for late or missed homework will be given. However, if you missed homework for a reason beyond your control, make sure I know about it.

Homework should be typed, not handwritten. In text format. You are encouraged to discuss homework with other students, as long as the individual answers are unique. If I find that different students give the same answers to a particular homework problem, the scores for these answers will be automatically "0" for everyone

involved: “share your thoughts, not your texts”. Finally, if an answer is found out to be copied verbatim from published work and/or internet, the grade will be also “0”.

Grant Proposal: You will be developing a grant proposal on a topic of your choice in microbial genetics, preferably with a partner. You will be expected to identify a partner (Co-PI) for your research proposal and these proposals will be due on Nov. 10. The proposals will have a seven-page (single-spaced) limit and be on some topic in microbiology, with mainly genetic approach. You can complement genetic approaches with additional approaches. After that each student will review the proposals of three other groups in a two-week period. Finally, about half the class will be involved in a mock grant panel in which each proposal is critically evaluated, based on the various reviews. Each proposal will then be ranked relative to the rest.

In order to decrease ethical challenges inherent in judging your colleagues, and increase the candor and criticalness of the reviews, two steps will be taken: (i) All proposals and reviews will be coded so that authors are anonymous. (ii) Grading will be based on MY assessment of the quality of the proposals and of the reviews, and not on the actual scoring of reviewers and panelists.

Course Grades: You will be evaluated based on your class participation (35%, this includes both your participation during discussion and your presentation), your written answers to the homework problems (35%), your proposal and your ability to critically evaluate others’ proposal (30%).

Class Participation: This course is not about facts, — rather, it is about the original questions, the ideas, the experimental logic and observations that form the foundation of these facts, — and *this* material rarely receives adequate coverage in modern textbooks. Basically, the purpose of taking the class is to learn how to think logically than to uncritically memorize tons of data. Therefore, attending lectures and actively taking part in the discussion is in your best interests. Please bring your reading list papers, a pen/pencil, and blank papers to the class- you may want to draw schematics. If you have a laptop, an iPad or a smart phone, please also bring it to the class.