

BIOLOGY 4410/6410: Microbial Ecology

Spring 2012 Tentative Syllabus

Instructor:

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Course description: This course provides an in-depth overview of microbial communities and the interactions of microbes within ecosystems. Specific topics will include astrobiology, microbial origins, microbial communities, genomics, biotransformation, symbiosis, and biodegradation.

Textbook: There is NO textbook for this class! We will be reading primary literature and review articles throughout the semester. There is a recommended text: Madigan et al. Brock Biology of Microorganisms. 12th edition (although other editions are fine as well). Pearson/Benjamin Cummings (2008). The new radio-frequency PRS (personal response system) is also required for the course.

Grading: There will be **THREE (3) Lecture exams** and **ONE (1) Final exam**, as well as in class activities and presentations. All exams will consist of a variety of multiple choice, short answer and short essay. Make up exams will be different than the original exams.

Students will give two presentations during the semester, each worth 15% of the of presentation grade. Students enrolled in 4410 will work in pairs to present one journal article relevant to the course material for their first presentation and will present a proposal presentation to study the microbial community of their choice for the second presentation of the semester. Students enrolled in 6410 will work individually to present and critique the current literature in a chosen field of microbial ecology (worth 15% of the presentation grade). 6410 students will be required to write a 2-3 page brief proposal indicating the purpose and significance of their research idea (worth 5% of the participation grade) and then will present their research proposal in a presentation to the class (worth 10% of the participation grade).

The PRS system will be employed to help assess students in an informal manner during class lectures and activities. Student performance with PRS questions will be considered towards the final grade under class participation. The grade distribution will be as follows:

In-class exams – 15% each, 45% total

In class presentations (2 for 4410, 2 plus white paper for 6410)– 30%

Attendance/participation – 5%

Final exam – 20%

GT Honor code: All students are expected to follow the Georgia Tech Academic Honor Code (www.honor.gatech.edu). This includes, but is not limited to the following issues pertaining to exams, quizzes, PRS activities and presentations for this class: plagiarism is not permitted and will be dealt with according to the GT Academic Honor Code. For group oral presentations, students may collaborate in all aspects of the work. It is expected that all members of the group will contribute equally to the final product and that they will share the single grade. Students

may use copyrighted figures from publications in the PowerPoint presentation, however appropriate citations must be provided on the PowerPoint slide.

Student success: Students are expected to read the assigned papers prior to class to aid in their understanding and participation during lectures. Students are expected to attend lecture. Lecture information will NOT come entirely from the reading assignments. It is the responsibility of the student to obtain any missed information, instructions or materials that results from a missed lecture. Lecture Powerpoint presentations will be posted on T-square either before or after lecture but always before the respective exam. Students are also expected to be proactive, meeting with their TA or instructor should they encounter difficulties in the class, require assistance or have any unanswered questions.

Important Georgia Tech Dates:

Monday	1/9/12	Classes begin
Monday	1/16/12	School holiday
Thursday	2/2/12	Last day to drop individual courses with a grade of "W"
Monday-Friday	3/19-23/12	Spring Break
Friday	4/27/12	Last day of classes

Important Course Dates:

		Exam I
		Exam II
		Exam III
Monday	April 30 (11:30am - 2:20pm)	Cumulative final exam

Tentative Lecture Schedule: *Class meets MWF 10:05 am - 10:55AM, College of Computing*
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(Topics may be modified/omitted due to time constraints and exams dates may be changed.)

Week	Dates	Reading	Topics
1	1/9-13		Introduction to course and Microbial Ecology Review of Cells
2	1/16-20		*1/16/11 – GT Holiday Beginnings of Microbial Ecology Microbial Origins Astrobiology
3	01/23-27		Microbial Evolution and Diversity Definition of Microbial Communities
4	1/30-2/3		Microbial Interactions Genomics in a Microbial Community – Warfare versus share and share alike *Exam 1?
5	2/6-10		Microbes and Biogeochemical Cycles C, N, S, Fe cycling within microbial communities
6	2/13-17		Biogeochemical Cycles and Determinants of Microbial Life
7	2/20-24		Exploration of Microbial Communities – Forest and Agriculture *Exam 2?
8	2/27-3/2		Exploration of Microbial Communities – Aquatic Systems
9	3/5-9		Exploration of Microbial Communities – Extreme Systems as Models for Astrobiology Microbial Symbiosis – Building their communities
10	3/12-16		Exploration of Microbial Communities – Humans as a Petri Dish *Exam 3?
11	3/19-23		SPRING BREAK – ENJOY!
12	3/26-30		Microbes and <u>Wall-E</u> : Transforming and Cleaning Transformation of Refractory Compounds
13	4/2-6		Transformation and the Ecosystem, Bioremediation, Sorption, Immobilization
14	4/9-13		Common pollutants and microbial solutions
15	4/16-20		Engineering the system – genetic engineering in microbial systems
16	4/23-27		Student Presentations Course Wrap Up
17	April 30	Monday	FINAL EXAM 11:30am - 2:20pm