

MIBO4300/6300. Environmental Microbiology and Biotechnology. 3 hours

Course description: Microorganisms used in biotechnology, agriculture, bioremediation, and industry; distribution, taxonomy, and physiology of environmentally significant microorganisms.
Prerequisite: MIBO3500.

Instructor: Prof. Barny Whitman, 541 Biological Sciences, 542-4219, whitman@uga.edu, office hours by appointment.

Class: Mondays, Wednesdays, and Fridays, 11:15-12:05, room 404C Biological Sciences.

Textbook: As necessary, I recommend that you consult advanced textbooks, which are on reserve in the Science Library:

Madigan and Martinko (11th ed.) Brock Biology of Microorganisms

Staley, Gunsalus, Levy and Perry (2nd ed.) Microbial Life

Other resources include: The Prokaryotes, ed. M. Dworkin et al. (2006) available electronically.

Go to Galileo, go to Databases, browse to "The Prokaryotes"

Bergey's Manual of Systematic Bacteriology, available at the reference desk of the Science Library

Grading policy: For MIBO4300, the grade will be computed from the four midterm grades, the comprehensive final, and any extra point credits you earn. Make up midterm examinations will not be given without two excusable absences. The grade will be the highest of the following:

1. The average of all four midterm examinations (25 % each) plus any extra credit points you earn.
2. The average of the three highest midterm examinations (25 % each) and the final (25 %) plus any extra credit points you earn.

Students may earn up to five (5) points of extra credit in two ways. One, seminars in the Department of Microbiology are usually on Thursdays at 11:00 am in room 404D, and the schedule is listed at the Department website and in the hall way outside of Biosciences room 527. In addition, seminars hosted by other departments on prokaryotic biology may be used. A brief report (2 typed pages) which summarizes the talk will be due within four days (usually Monday) following the seminar. These write-ups should include: (i) the name of the speaker, title of the seminar, and date of the talk; (ii) a brief introduction of the subject in which relevant background information is discussed; (iii) a summary of the experiments presented by the speaker- what was done, why was it done, and what were the results; and finally (iv) what conclusions were reached by the speaker. Each write-up will be judged according to its clarity and content and will be graded on a scale of 0 (unsatisfactory) to 1 (outstanding). Please note that no credit will be given for reports turned in to any other course.

Two, the second option is a review of an area of the literature on one of the topics discussed in this course. The review should be 10 typed pages in length and refer to no fewer than 5 papers from the primary literature. All topics must be approved by Dr. Whitman prior to April 1. Each paper should include an introduction which provides the relevant background, a summary of the papers, and a discussion of the important conclusions. Otherwise, the format should follow that described in the "Instructions to Authors" for Microbiology and Molecular Biology Reviews 70 (2006). Papers are due by April 28 and will be graded on a scale of 0 (unsatisfactory) to 5.0 (outstanding) based on their content, clarity and grammar.

Students in MIBO6300 may not earn extra credit by option 1 (reporting on the seminars). However, students in MIBO6300 may earn extra credit by option 2 (a paper) or presenting a lecture to the class of approximately 20 min. The topic of the lecture should be approved by Dr. Whitman prior to April 11. Otherwise, the grading policy is the same.

Spring 2008 Calendar: MIBO 4300: 11:15-12:05 am, Biological Sciences 404C

	Monday	Wednesday	Friday
January	7 The importance of prokaryotes in our understanding of biology	9 Concepts of prokaryotic diversity	11 Concepts of prokaryotic diversity
	14 Prokaryotic systematics	16 Prokaryotic systematics	18 Methods in environmental microbiology
	21 MLK Jr. holiday	23 Natural populations of prokaryotes	25 Natural populations of prokaryotes
February	28 Modern populations of prokaryotes	30 Modern populations of prokaryotes	1 Bioenergetics and diversity
	4 Midterm 1 (Jan. 7-Jan. 30)	6 Anaerobic photosynthetic bacteria	8 Marine cyanobacteria and their relatives
	11 Sulfur-oxidizing bacteria	13 Methane and C1-oxidizing bacteria	15 Nitrifying bacteria
	18 Nitrifying bacteria	20 H ₂ , CO -oxidizing bacteria	22 Fe ⁺² -oxidizing bacteria
	25 Mining with microorganisms	27 Magnetotactic bacteria and the tricky microaerophiles	29 Midterm 2 (Feb. 1-25)
March	3 Introduction to the anaerobic environment	5 Denitrifying bacteria	7 Annamox bacteria
	10 Spring break	12 Spring break	14 Spring break
	17 Sulfate-reducing bacteria	19 Iron-reducing bacteria	21 Homoacetogenic bacteria
	24 Methanogenic archaea	26 Substrate level phosphorylation	28 Interspecies H ₂ transfer
April	31 Microbial bioengineering for chemical biosynthesis	2 Midterm 3 (Feb. 27-Mar. 28)	4 Degradation of aromatic compounds (aerobic)
	7 Degradation of aromatic compounds (anaerobic)	9 Myxobacteria: the wolves of the leaf litter	11 Bdellovibrios: microbial weasels
	14 Vertebrate symbioses	16 Invertebrate symbioses	18 Extreme thermophiles
	21 Psychrophiles and other extreme environments	23 Some really fascinating topic	25 Midterm 4 (Mar. 31-Apr. 23)
	28 Another really fascinating topic (last class)		

FINAL Monday, May 2 12-3; room 404C Biosciences

For course notes and study guides, see: <http://whitman.myweb.uga.edu/courses.html>