

CE 573 / 773 – SPRING 2008
BIOLOGICAL PRINCIPLES OF ENVIRONMENTAL ENGINEERING PROCESSES

Instructor:

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Office Hours – Monday 1-3 pm; Tuesday 1-3 pm; Thursday 1-3 pm

TA:

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Class Times & Location:

Tuesday 6:00 - 9:50 pm

Lecture - Learned Hall Room 2111 (meet in 2111 at 6pm)

Lab - Learned Hall Room 3109

Required Materials:

Madigan, M.T., Martinko, J.M., and J. Parker. *Brock Biology of Microorganisms*, Eleventh Edition (2006).

Course Description and Goals:

This is intended as an entry-level graduate course for students interested in the role of microorganisms in environmental processes. The emphasis in both lecture and laboratory is to obtain a fundamental knowledge of microbiology that is grounded in practical applications. Upon completion, students should appreciate the public health significance and engineering utility of microorganisms, and they should understand how microbial physiology, growth, and metabolism relate to these topics. The course also takes an experimental approach with students developing skills to collect and evaluate laboratory data.

Course Objectives:

1. To appreciate the public health significance and engineering utility of microorganisms.
2. To learn the terminology of microbiology such that you can communicate about biological systems using basic principles.
3. To learn basic literature review and laboratory skills such that microbiological data can be interpreted with skill.
4. To list the nutritional needs of microorganisms and describe how organisms process carbon and generate energy.
5. To apply basic principles of microbiology to solve environmental problems or to optimize a biotechnical application of microorganisms.

Student Expectations and Evaluation Criteria:

Students are expected to master the course material, be able to communicate effectively (both written and oral), be able to analyze and interpret data, and be intellectually engaged in class.

The assignments are designed to help students achieve the course objectives. Grades will be assigned with the evaluation criteria in mind. Final letter grades will be based on a curve, but cutoffs are expected to be within 5 points of the typical values of 90+ (A), 80+ (B), etc...

Mid-Term Exam.....	15%
Final Exam (Comprehensive).....	25%
Quizzes.....	10%
Lab Reports & Assignments.....	30%
Lab Project & Presentation.....	20% (differs for those enrolled in 573 vs 773)

Class Guidelines and other fine print:

- 1. Assigned Reading:** You are expected to do the assigned reading, listed on each lesson plan, before coming to class. The lectures will focus on clarifying difficult material and presenting unifying concepts. The text includes required material that will not be covered in lecture. You should use each lesson plan as a guide.
- 2. Blackboard:** The course will use the University's blackboard site (<http://courseware.ku.edu/>) to post course materials. Also, students will be required to take graded quizzes on blackboard. These will be due at the beginning of class, the day they are due.
- 3. Classroom Ethics:** This course has a zero-tolerance policy regarding plagiarism, copying others' work, and cheating. Students guilty of these will be given a grade of 0 and referred to the Academic Affairs Committee.
- 4. Grade changes:** If points are added incorrectly on an exam, the error will be fixed. Otherwise, grades on exams and assignments will not be changed.
- 5. Late Policy:** Assignments will be collected at the beginning of class the day they are due, or as otherwise stated. Any assignment that is turned in after this collection will be given a 50% grade reduction. If a major assignment is not turned in (an exam or the final lab project report), the student will receive an incomplete in the class until its completion.
- 6. Special Accommodations:** Students who need accommodations for any type of disability should meet with the instructor to make necessary modifications.
- 7. Make-up Exams and Exceptions:** Penalty-free extensions and make-up exams may be granted for emergencies such as illness, family deaths, jury duty, etc... The instructor has the sole authority in determining what an emergency is and will require proof.
- 8. Cell Phones, etc...:** Turn off cell phones, PDAs, and other noisy and distracting devices before entering class / lab.

CE 573 / 773 – CLASS SCHEDULE - SPRING 2008
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<u>Dates</u>	<u>Lesson Plan</u>	<u>Lab</u>
T - Jan 22	LP1: Intro - biological significance LP2: Microbial diversity and scope	Lab 1: Microbial Dispersion
T - Jan 29	LP3: Biological molecules	Lab 1 Discussion / Lab 2 Prep
T - Feb 5	LP4: Central dogma of life (molecular biology)	Lab 2: Enumeration - Plating
W - Feb 6	KU Environmental Engineering Conference	
T - Feb 12	LP4: Molecular biology cont...	Lab 2: Gel work / Lab 3 Prep
T - Feb 19	LP5: Microbial Anatomy	Lab 3: Electrophoresis
T - Feb 26	LP6: Metabolism	Lab 3: Gel work / purification
T - March 4	LP7: Metabolic Regulation	Lab 4: Prep
T - March 11	Midterm Exam	Lab Project Discussion
T - March 18	Spring Break - No Class	
T - March 25	LP8: Substrate Utilization and Growth	Lab 4: Chemostat Operation
T - April 1	LP9: Growth Kinetics	Lab 4: Analysis / Project Meetings
T - April 8	No Class	Lab Project - Self Directed
T - April 15	LP10/11: Water Quality & Wastewater Treatment	Lab Project
T - April 22	LP12/13: Soils & Bioremediation	Lab Project
T - April 29	LP14: Bioengineering (“Create your own microbe”)	Lab Project
T - May 6	Lab Projects and Presentations Due	Presentations Cont...
T - May 13	Final Exam 7:30 - 10:00pm	

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<u>Due Dates</u>	<u>Assignment</u>
T - Jan 22	LP1: Quiz (due on the blackboard site) LP2: Quiz
T - Jan 29	LP3: Quiz Lab 1 Rubric Exercise Due
T - Feb 5	LP4: Quiz
T - Feb 12	Assignment 1 Due - Molecular Biology Tools
T - Feb 19	LP5: Quiz Lab 2 Report Due - Enumeration
T - Feb 26	LP6: Quiz
T - March 4	LP7: Quiz Lab 3 Report Due
T - March 11	Midterm Exam
T - March 18	Spring Break - No Class
T - March 25	LP8: Quiz
T - April 1	LP9: Quiz
T - April 8	No Class Assignment 2 Due - Kinetics
T - April 15	LP10/11: Quiz Lab 4 Report Due
T - April 22	LP12/13: Quiz
T - April 29	LP14: Quiz Assignment 3 Due
T - May 6	Lab Projects and Presentations Due
T - May 13	Final Exam 7:30 - 10:00pm