

# Environmental Microbiology (Bio Sci 301 3A)

## Lab Syllabus

Fall 2006

**Instructor:** Dr. Melanie Mormile

**Office:** M2 Schrenk Hall

**E-mail:** mmormile @ umr.edu

**Phone:** 341-6346

**Dr. Mormile's Office Hours:** 10:30-11:30 Thursdays and by appointment

**GTA:** Bo-young Hong

**Office:** 301 Schrenk Hall

**E-mail:** byhwb3@umr.edu

**Phone:** 341-6807

**Textbook:** *Environmental Microbiology, Second Edition*, by Ian L. Pepper and Charles P. Gerba.

**Laboratory Procedures:** Good aseptic technique is the key to success in the microbiology laboratory and the successful completion of each exercise depends on strict adherence to good aseptic technique. The microscopes used in our microbiology laboratory are high quality but are useless if not handled with proper care. Proper use of the microscopes is essential and failure to adhere to good laboratory practice will result in the loss of laboratory skill points. Attendance to all lab periods is expected. If you need to miss a class, please let the instructor know.

**Grading:** The laboratory grade is worth a total of 100 points. There will be no make-up labs. If you miss 3 or more labs, 30 points will be deducted from your overall lab grade. Missing more than 4 labs will result in dismissal from the course. The lab grade will be broken down as follows:

|           |  |
|-----------|--|
| 10 points | Laboratory skills (conduct, microscope care, attendance) |
| 75 points | Five lab reports each worth 15 points                    |
| 15 points | Term paper   |

**Laboratory Skills:** Repeated abuse or mishandling of microscopes, unsafe lab practices, and excessive absences will result in loss of all or a portion of these 10 points.

**Lab Reports:** Each lab report will be 4-6 pages long and will include graphs and/or tables. They will be in the format of a journal article (Introduction, Materials & Methods, Results, Discussion, and References Cited). Five labs will be designated for report write-ups (marked with a \* below) and will be due a week after completion of the lab. Three points will be deducted each day the report is late. Each report is worth 15 points for a total of 75 points.

**Term Paper:** The term paper will be a critique of a current or newly proposed method used in Environmental Microbiology. A good source for new methods is the journal Applied and Environmental Microbiology. There are also other microbiology journals available in the library or through the instructor. The focus of discussion should be the strengths and potential limitations of the method as compared to other methods.

Papers should be ~10 pages long and refer to at least three peer-viewed research papers. Topics need to be approved by the instructor.

## Lab Schedule

|              |  |
|--------------|--|
| August 21    | Class policies, safety and microbial diversity lecture   |
| August 28    | <b>Experiment #1</b> – Bacterial Counts*   |
| September 4  | Labor Day – Enjoy your time off  |
| September 11 | Sampling trip to Lion's Club Park<br><b>Experiment #2</b> – Water Content of Samples   |
| September 18 | Set-up enrichments for ferric iron-reducing bacteria, sulfate-reducing bacteria, nitrate-reducing bacteria, aerobic phenol degrading bacteria and aerobic 2,4-dichlorophenol degraders |
| September 25 | Start isolating enriched organisms   |
| October 2    | <b>Experiment #3</b> – Contact Slide Assay   |
| October 9    | <b>Experiment #8</b> – Dehydrogenase Activity of Soils*<br>Finish Experiment #3  |
| October 16   | <b>Experiment #9</b> – Nitrification and Denitrification*<br>Finish Experiment #8  |
| October 23   | <b>Experiment #15</b> – Bacteriological Examination of Water: The Coliform MPN Test<br>Continue with Experiment #9   |
| October 30   | <b>Experiment #12</b> – Biodegradation of Phenol Compounds*<br>Continue Experiment #15<br>Finish Experiment #9   |
| November 6   | <b>Experiment #17</b> – Defined Substrate Technology*<br>Complete Experiment #15   |
| November 13  | Fieldtrip – To Be Arranged   |
| November 20  | Thanksgiving Vacation – Enjoy your time off  |
| November 27  | Experiment #24 – Amplify 16S rRNA gene of isolates, verify via gel electrophoresis, and sequence   |
| December 4   | Analyze Sequences via BLAST  |