Texas A&M University-Corpus Christi
College of Science and Technology

BIOL 5417 – MICROBIAL ECOLOGY

SYLLABUS

INSTRUCTORS:
Lecture: Dr. Joanna Mott
Laboratory: Dr. Stella Doyungan

OFFICE:
Dr. Mott: CS 246/ST 319.
Office hours
W 2.00-4.00 p.m. CS 246, TR 10.45 am-12.15 p.m. ST 319
Additional office hours by appointment.
Phone 825-6024 Email: Joanna.mott@tamucc.edu

Dr. Doyungan: ST 308
Office hours: TR at 10:00-12:00 a.m. and 3:00-3:30 p.m.
Additional office hours by appointment
Phone 825-3686 Email stella.doyungan@tamucc.edu:

MEETS:
Lecture: TR 9.30-10.45 a.m. CI 122
Lab: W 1.00-3.55 p.m. CS 231

COURSE DESCRIPTION:
Relationships between microorganisms and their biotic and abiotic environments. Role of microorganisms in biogeochemical cycling. Methodology in microbial ecology. Biotechnological aspects. Pre-requisite BIOL 2421 Microbiology or equivalent.

STUDENT LEARNING OUTCOMES:
- Students will develop a broad understanding of the development and current status of the field of microbial ecology, and compare and contrast the roles and characteristics of microbes in different environments.
- Students will be able to discuss the diversity and complexity of interactions between microbes and other organisms and select examples of different kinds of interactions.
- Students will integrate information on effects of abiotic factors on microorganisms to predict distribution and diversity in different environments.
- Students will research and design a laboratory experiment which they will explain and perform with the other students.
- Students will be able to evaluate and perform techniques to study microorganisms from different environments and compose lab reports.
- Students will be able to critically discuss current research and applications of microbes in areas of environmental concern.
- Students will develop leadership skills through group activities and presentations to the class.

ADDITIONAL READINGS:
Students will be expected to search and evaluate current literature and to present and lead discussion of examples of research on topics covered in class. Additional readings on current topics from a range of journals and texts such as Applied and Environmental Microbiology, Advances in Microbial Ecology, Water Research, Microbiology and Molecular Biology Reviews, Soil Microbiology, American Society for Microbiology News, Environmental Microbiology, Biodiversity of Microbial Life (Staley and Reysenbach), Brock Biology of Microorganisms (Madison et al.) will be assigned throughout the course.

LAB MANUAL: None required
Graduate students will undertake an independent project to develop a lab activity including handouts etc. and lead the class for the student lab period. A number of sources may be used including Handbook of Methods for Aquatic Microbial Ecology, Manual for Environmental Microbiology (ASM 1997, 2002, 2007), Techniques in Microbial Ecology (Burlage et al. 1998), Methods in Soil Analysis Part 2. Microbiological and biochemical properties (Soil Science Society of America 1994) and Laboratory Exercises in Microbiology (Harley and Prescott 2002)

ATTENDANCE:
Students are expected to attend every scheduled class and laboratory meeting, be punctual and exhibit professional behavior. Cell phones should be turned off. The instructor should be notified PRIOR to lab if student will be absent (except in emergency situations). Additional time in lab or return on an extra day is required some weeks due to the nature of microbial growth.

EVALUATION:
**Lecture: 65% - 3 lecture exams (15% each), final comprehensive exam (20%).** Exams will be given at the same time as the undergraduate class; however, specific questions for the graduate students will be included and will require analysis, comparison and discussion of topics. Graduate students will also be given additional reading assignments for greater coverage of certain topics, will lead discussion of these with the rest of the class and their exams will include questions on this material. Graduate students will be expected to answer questions in greater depth and exams will be graded accordingly.

**Lab: 25% - reports (16.25%) notebook (5%) exams (3.75%)**
**Additional assignments: 10% - class group assignments (2.5%) review paper and presentation (7.5%).** Each student will be required to complete a review paper as approved by the instructor and present it to the class during the last two weeks of class.

**NOTE: Class presentations may be scheduled during the last week of classes**

Except in cases where prior arrangements have been made with the instructor or a documented emergency, there is NO provision for making up late work and/or missed quizzes or exams.

Evaluation is ongoing to enhance experimental learning, providing the student with feedback about performance in meeting the student learning outcomes. Conferences with the faculty provide opportunities to discuss progress toward the student learning outcomes.
Grading is a process of measuring the outcome of learning against standards and assigning a symbol to the level of performance achieved. The final course grade, therefore, rests with the professor.

**All students are expected to conform to college-level standards of ethics, academic integrity, grammar and spelling. In particular, you should review pages 26-27 of the 2008-2009 A&M-CC catalog. Except in cases where prior arrangements have been made with the instructor, there is no provision for making up late work and/or missed quizzes or exams.**

*Disability and Veterans’ Services:* Texas A&M University-Corpus Christi is committed to providing persons with disabilities an equal opportunity to access campus facilities, resources and programs. The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. Support and accommodations are also available for returning veterans who experience cognitive and/or physical access issues in the classroom or on campus. Our Office of Disability Services arranges such support and academic accommodations. To make a request, or for more information, call (361) 825-5816 or visit Driftwood 101. It is important to contact the Office of Disability Services in a timely fashion as it will take time for them to review requests and prepare accommodations and accommodation letters.

**Grade Appeals:** As stated in the Texas A&M University-Corpus Christi University Rules and Procedures (Section B [Academic Program], Part 13 [Students]: 13.02.99.C2 [Student Grade Appeals] and 13.02.99C2.01 [Student Grade Appeal Procedures]), a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is on the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, consult the University Rules and Procedures specified above (accessible through the University Rules and Procedures website at http://www.tamucc.edu/provost/university_rules/index.html). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.
BIOL 5417 - MICROBIAL ECOLOGY
FALL 2009

TENTATIVE COURSE SCHEDULE

Please note that this schedule including exam times, is subject to changes, which will be announced in class. Responsibility to keep up with changes, assignments etc. lies with the student. Students will present and discuss information to the class from readings (journals, books), for each topic during the semester.

WEEK
1      I. Introduction to environmental microbiology/microbial ecology
        - definitions
        - development as a scientific discipline

2-3    II. Diversity of microorganisms

4-5    III. Population interactions
        - among microbial populations
        - between microorganisms and plants
        - between microorganisms and animals

Exam 1
6      IV. Microbial communities and ecosystems

7-8    V. Effects of abiotic factors and environmental extremes on microorganisms

9      VI. Methodology and techniques in microbial ecology

Exam 2
10-12  VII. Microorganisms in their natural habitats
        - air
        - water
        - soil

13     VIII. Biogeochemical cycling

Exam 3
14-15  IX. Applications of environmental microbiology/microbial ecology
        - e.g. biodeterioration, bioremediation, pest control, genetic engineering, plant disease control, bioterrorism

NOTE: Class presentations may be scheduled during the last week of class. Exact dates of exams will be announced in class at least one week prior to the exam date.

Final Exam: Tuesday December 15  8.00 – 10.30 a.m.