Instructor: Dr. Mary Beth Leigh  
Office: 228 West Ridge Research Building (WRRB)  
Phone: 474-6656  
Email: mbleigh@alaska.edu  
Office hours: XXXXXXX or by appointment

Class time and place  
Tuesday and Thursday 9:45-11:15

Course overview  
This course provides a comprehensive overview of the role of microorganisms in environmentally relevant processes including bioremediation of pollutants, biogeochemical cycling and wastewater treatment, and covers modern molecular methods for studying microbes in the environment. Upper level undergraduate students in Biology, Chemistry, Civil & Environmental Engineering or other disciplines will gain expertise in microbial processes with an emphasis on their application to environmental quality issues. The class is stacked and will meet concurrently with the graduate-level (BIOL 6XX) section (graduate student requirements are listed separately on the BIOL 6XX syllabus).

Prerequisites  
Students should have taken ENGL 111X, ENGL 211X or 213X, BIOL 115/116 (Fundamentals of Biology), BIOL 342 (Microbiology) and CHEM 105/106 (General Chemistry) or equivalent. Exceptions may be made on an individual basis with permission of instructor.

Reading materials  
- Many readings will be in the form of scientific journal articles, which are electronically available through UAF library and/or provided on Blackboard.
- There is no required text. A recommended text is *Brock Biology of Microorganisms* by Madigan and Martinko (11th, 12th or 13th Ed.). This and several other books are on reserve at the BioSciences library from which some reading assignments will be made, including:  
  - *Environmental Microbiology*, by Maier, Pepper and Gerba  
  - *Microbe*, by Schaechter, Ingraham and Neidhardt  
  - *Microbiology*, by Bauman  
  - *Biocatalysis and Biodegradation*, by Wackett and Hershberger

Course goals  
- Provide a comprehensive overview of the role of microorganisms in environmentally relevant processes including bioremediation of pollutants, biogeochemical cycling and wastewater treatment  
- Cover state-of-the-art research and molecular methods in microbial diversity, microbial function and the impacts of microbes in the environment  
- Develop strong skills in scientific writing
Student Learning Objectives

- Understand application of microbial processes to environmental remediation
- Appreciate contribution of microorganisms to geochemical cycling
- Become familiar with methods for studying microbes in the environment
- Develop skills in reading and criticism of primary scientific literature
- Develop literature research, writing and oral presentation skills

Course format: Lectures with supporting readings from textbooks and primary scientific literature will form the knowledge base of the course. Journal articles relevant to the current topic will be assigned for critical group discussion. Several individual conference times with instructor will also be held to discuss students’ writing throughout the semester.

Assignments: The goals of these exercises are to help develop research, writing and oral presentation/teaching skills important to success in their postgraduate scientific careers.

- **Reading questions:** When journal articles are assigned for reading and discussion, reading questions (short answer, short essay) will also be assigned which should be completed before the beginning of the discussion class period.
- **Diagnostic writing assignment:** Early in the semester, students must complete a diagnostic writing assignment. Feedback will be provided by the instructor regarding aspects of the students’ writing that need improvement, and the instructor will help the student improve these areas through the term paper project (below).
- **[B] Term paper and presentation:** All students will independently research an environmental microbiology topic of their choice, subject to instructor approval. Students will prepare a term paper in the form of a review article of 20 pages in length. Students will then deliver ~25 min oral presentations to the class near the end of the semester. Detailed instructions for papers and presentations will be provided in class. **[D]** An outline and first draft of the paper will be due prior to the final paper. **[C]** Feedback will be provided by instructor on the outline, first draft and final draft of the paper, in the form of detailed written comments and through individual conferences with the student following. See schedule below for relevant deadlines.

*Support for term paper: Assistance with library research can be provided by Biosciences librarian Anne Christie (anne.christie@uaf.edu). For additional guidance with writing consult the Writing Center (8th floor, Gruening Bldg).

Exams: One in-class midterm and final exam will be given to all students, with questions in a variety of formats from multiple choice, fill-in-the-blank, short answer and essay.

Journal article discussions: Journal articles will be assigned in advance of discussions and made available on Blackboard. Reading questions will also be assigned at the same time. Written responses to these reading questions should be completed before the beginning of the discussion class period. I will assign 1-2 class members to lead the discussion.
Note on written assignments: Plagiarism will result in a failing grade. Be sure to acquaint yourself with the definition of plagiarism to avoid accidental errors at http://www.uaf.edu/library/instruction/handouts/Plagiarism.html

Course evaluations: I welcome your positive and negative comments at any time. Opportunities to provide anonymous evaluations will be provided at the middle and end of semester.

Students with disabilities
UAF is committed to equal opportunity for all students. Students with even minor disabilities, students who are the first in their families to attempt a four-year college degree, or students whose incomes are low, have opportunities for tutorial and other forms of support from the office of Disability Services or the office of Student Support Services. If you need classroom accommodations or other support, please meet with me during office hours as soon as possible to let me know; and please make an appointment with the Office of Disability Services and Student Support Services, to enlist the appropriate support. I will collaborate to provide the appropriate accommodations and supports or services to assist you in meeting the goals of the course.

Grading Scale
(\% of total course points)

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<tr>
<th>Grade</th>
<th>Percentage</th>
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<td>A</td>
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Late policy:
Assignments turned in after the deadline will have 5\% of the total possible points deducted per day it is late. Exceptions may be made in the case of excused absences due to documented family/medical or other reasons or when arrangements have been made with instructor in advance. In general, when an absence is anticipated due to travel or other conflicts, work should be turned in ahead of time.
### Comment:

See highlighted columns above. Note that written work constitutes 63% of points earned in the class. This takes into consideration that at least 50% of exam questions are written (short answer, essay), plus there are points from journal reading questions, and all components of the term paper.

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<thead>
<tr>
<th>Activity</th>
<th>Number of assignments</th>
<th>Points per assignment</th>
<th>Total</th>
<th>Points from writing-intensive work</th>
<th>Percentage of total points from written work</th>
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