SYLLABUS: BIOL 457/657 Environmental Microbiology
Spring 2018

Instructor:
Dr. Mary Beth Leigh (mbleigh@alaska.edu)
Associate Professor of Microbiology
Office: 228 West Ridge Research Building (WRRB)
Office hours: By appointment - email or inquire before/after class to set a time

Collaborating guest instructor:
Dr. Sarah Stanley (sstanley2@alaska.edu)
Associate Professor of English, Director of University Writing

Course website:
environmentalmicrobiology.community.uaf.edu

Class time and place
MWF 10:30-11:30 am, Murie 107

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. Upper level undergraduate students and graduate students in Biological Sciences, Chemistry, Civil & Environmental Engineering or other disciplines will gain expertise in microbial diversity and processes with an emphasis on their application to environmental quality issues. Class activities include lectures, discussions of readings, scientific and creative writing projects, and a field trip.
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.

Course materials
- **Course website:** [environmentalmicrobiology.community.uaf.edu](environmentalmicrobiology.community.uaf.edu) - The SCHEDULE is the centralized location for the majority of our class materials and will be updated frequently with links to lecture slides, readings, and assignments, and deadlines. Students will be asked to post some assignments and projects on the website. Note that the website is publicly accessible.
- **Blackboard** will be used for posting grades and some online homework assignments.
- **Perusall** will be used for annotating all of our comments onto journal articles prior to discussion. Create a Perusall account (go to perusall.com - you can sign in with google and use your UA login if you’d like or create a different login). Then enter the following access code to join this class: BETH-LEIGH-3050
- **Readings** – There is no single required textbook for this course. Reading assignments in support of lecture content can be found in several textbooks that are available electronically through the UAF library (clickable links are on the website on the syllabus page) and others that are on reserve in hard copy at the Rasmuson Library Reserves Desk, as well as in the form of journal articles posted on the online schedule.
  - **Scientific journal articles and book chapters** - Many readings will be drawn from the primary scientific literature. Links or pdfs will be provided.
  - **Electronically available books** (free through UAF Library website - click links below):
    - *Microbial Diversity: Form and Function in Prokaryotes, 1st Ed.*, by Oladele Ogunseitan
    - *Environmental Microbiology, 2nd Ed.*, by Maier, Pepper, Gerba (Note that the first author is listed differently as either Maier or Pepper depending on whether you’re in the Library search engine or reading the book - just be sure you’re on the 2nd edition if in doubt)
    - *Microbial Ecology, by Barton and Northrup*
    - *Writing Science by Joshua Schimel* (2012, Oxford Press). I’ll also provide some pdfs of selected chapters but this is an excellent book that you may like to own and read in its entirety.
  - **Books on Reserve in Rasmuson Library**:
    - *Brock Biology of Microorganisms* 13th Ed. by Madigan et al. (2-hour or overnight checkout)
  - *Brock Biology of Microorganisms 14th Ed. (or older)* – if you own this from a previous class, it may be useful for review purposes
Course goals and Student Learning Objectives

- Understand the role of microorganisms in environmentally relevant processes including bioremediation of pollutants, biogeochemical cycling, and wastewater treatment
- Learn principles of microbial diversity and microbial ecological theory and how they apply to environmental microbiology
- Understand current methods in environmental microbiology research
- Strengthen skills in writing about science for audiences of differing backgrounds (experts, public, etc.).
- Improve oral communication skills
- Gain more experience with reading primary scientific literature
- Further develop critical thinking skills
- Develop creativity

Course format: Lectures with supporting readings from textbooks and primary scientific literature, as well as independent research, will form the knowledge base of the course. Journal articles will be assigned for critical group discussion to deepen understanding of the topics and develop oral communication and critical thinking skills. A variety of writing assignments will aid in developing synthesis and written communication skills. This semester, we will collaborate with an English Department faculty member (Sarah Stanley) to develop ideas for special class writing projects and to develop writing skills.

Assignments, projects, and exams:

- **Exams:** One in-class midterm (100 pts.) and a final exam (150 pts.) will be given to all students, with questions in a variety of formats from multiple choice, fill-in-the-blank, short answer and essay. Study guides and a review session (Q&A) will be offered prior to each exam.
- **Journal article discussions:** Journal articles will be assigned in advance of discussions and made available on Blackboard. Written Journal Article Pre-discussion Assignments are due on Blackboard and via Perusall by midnight on the deadline posted on the Schedule, typically 2 days prior to discussion. Students will be assigned to facilitate discussions (at least 1 week advance notice, there’ll be approx. one discussion per semester for undergrads, two for grad students). Credit is given for discussion facilitation (10 pts each time) and for discussion participation (50 pts total overall for the semester).
- **In-class activities and homework:** Throughout the semester there will be occasional in-class activities and projects requiring that worksheets or other products be turned in for credit. Some will be due the same day, and others will be taken home for completion and turned in later. Many, but not all, are noted on the SCHEDULE. Some may occur during class without notice.
- **MAJOR WRITING PROJECTS:** Students will develop creative group writing projects addressing environmental microbiology themes and targeting audiences (schoolchildren, public, other scientists, etc.) of their choosing. We will brainstorm and develop ideas stepwise during the semester with the assistance of our collaborating guest faculty member Sarah Stanley (Associate Professor of English, UAF). Mileposts and deadlines will be developed together and posted on the schedule. Projects may be
posted on the course website at the end of the semester and students may be asked to
give brief oral presentations of their projects to the class and/or to other target
audiences for credit.

● **ADDITIONAL REQUIREMENTS FOR GRADUATE STUDENTS:** In order to earn graduate
credit, grad students have additional requirements beyond those of undergrads. Grad
students will research an environmental microbiology topic of their choice (pending
instructor approval - topics supporting their thesis work are encouraged) and develop an
additional project, resulting in written and/or oral presentations. Grad students may
also be assigned additional peer reviews of other students’ writing projects and will
facilitate additional journal article discussions for credit.

**IMPORTANT NOTES ON PLAGIARISM AND ACADEMIC DISHONESTY**

● Plagiarism and/or other academic dishonesty on any assignment in this course will not
be tolerated. Plagiarism will result in a failing grade on the assignment, and may also
result in a failing grade in the course or even expulsion from the University, depending
on the severity, in accordance with the [UAF Student Code of Conduct](https://www.bw.uaf.edu/undergraduates/academic_honesty.php). Be sure to
acquaint yourself with the definition of plagiarism to avoid accidental errors!

● **Students are required to review the UAF policy on Academic Dishonesty and
Plagiarism, and then to pass the TWO QUIZZES on these topics.** You must email your
successful quiz confirmations (or have the system automatically do it by selecting me as
Instructor) to in order to receive credit.

**Student support**
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 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 Student Support Services to enlist the appropriate support. I will happily
collaborate to provide the appropriate accommodations and supports or services to assist you
in meeting the goals of the course.

**Support for writing:** For additional guidance with writing, you are encouraged to meet and with
me, work together with your peers, consult the Writing Center, and collaborating English
Department faculty member Sarah Stanley.

**Late work 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 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. If you anticipate being late to submit an assignment for an excused reason, please
email me to let me know asap.
THE COURSE SCHEDULE, including topics, lecture slides, readings, and assignment deadlines, will be posted on the website and updated frequently.

Point distribution (draft, subject to change).

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<thead>
<tr>
<th>Graded items</th>
<th>Number</th>
<th>Points per item</th>
<th>Total</th>
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<tbody>
<tr>
<td><strong>UNDERGRADUATES</strong></td>
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<td>Exam I</td>
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<tr>
<td>Final exam</td>
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<td>Writing Project(s): Points will be divided among different project stages (e.g. proposal, draft(s), peer reviews, and the final project)</td>
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<tr>
<td>Assignments/homework</td>
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<td>80</td>
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<tr>
<td>Discussion facilitation</td>
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<td>10</td>
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<tr>
<td>Discussion attendance and participation</td>
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<td><strong>Total (Undergraduates)</strong></td>
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<td>Additional grad student projects and tasks</td>
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<tr>
<td>Discussion participation</td>
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<td><strong>Total (Graduates)</strong></td>
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**Grading Scale**

(% of total course points)

- A+ 97 – 100
- A  94 - 96.99
- A- 90 - 93.99
- B+ 87 - 89.99
- B  84 - 86.99
- B- 80 - 83.99
- C+ 77 - 79.99
- C  74 - 76.99
- C- 70 - 73.99
- D  60 - 69.99
- F  < 60