Unearthing a Reservoir of Antibiotic Resistance  
(BIOL 497)  
Fall 2018 Syllabus

**Prerequisites:** BIOL 342, STAT 200X  
**Credits:** 4

**Location and meeting times:**  
Instructor meeting (224 WRRB): Tuesday/Thursday 3:30-4:30 PM  
Independent Lab (205 WRRB): 10 hours / week

**Instructor information**  
Dr. Devin Drown: 224 WRRB, 907-474-2602, dmdrown@alaska.edu  
office hours: Wednesday 10-11 AM

**Course readings/materials**  
Course readings will consist of papers from the primary literature. There is no required textbook for this course.

**Course description**  
This course will cover research questions on the nature of antibiotic resistance found in permafrost soils of Alaska. Briefly, this course will examine the microbial communities residing in permafrost from the Fairbanks area. We will explore research methods and tools used to collect and analyze soil microbiomes including next-generation sequencing techniques. This course will draw on the information gained in other courses and should also assist in finding links between seemingly disparate fields of biology. As climate change thaws the permafrost, antibiotic resistant microbes could have a significant negative impact on the health of Alaskans. Ultimately the data we collect will help to identify specific antibiotic resistant microbes that present a potential future health risk for Alaskans. This project will contrast the antibiotic resistance of ancient microbes to modern resistance, and potentially address if multidrug resistance is a modern phenomenon due to the overuse of modern antibiotics.

**Course Goals**  
The goal of this course is to address problems using the scientific method. This will include formulating a hypothesis, collecting new observations, and drawing a logical conclusion consistent with the data. Students will leave this course having acquired knowledge and comprehension of the research process.
Student Learning Outcomes

The successful student will complete this course with a variety of new knowledge and skills. By the end of the course, students will have a greater knowledge of the ecology and evolution of soil microbiomes. They will have both read and discussed current research methods as well as having actively applied some of the methods through the laboratory work. Students should be able to demonstrate an ability to:
- Find and explore and critically review the relevant literature
- Carry out the investigations, including collecting and analyzing data
- Draw valid conclusions from the analysis of the data
- Discuss the relevance of the conclusions in the context of previous findings

Instructional methods

This individual study course will include student directed discussions with the instructor and independent lab work. The weekly discussions will focus on providing students a background and context of the field as well as exploring analysis methods.

Course calendar

Research proposal

- Hypothesis or research question
- Brief timeline of proposed study

Due October 1, 2018

Background review

- Review of background literature to provide context for research topic

Due October 26, 2018

Analysis

- Written presentation (figures or graphs) of major results
- Description (including location) of all raw data collected

Due November 30, 2018

Research report

- Written in the style of a journal article including:
  - A title, authors, affiliations
  - Abstract
  - Introduction (with stated hypothesis/question)
  - Methods
  - Analyses and Results
  - Conclusions/Discussion/Future Directions

Due December 14, 2018
Course policies

**UAF Student Code of Conduct:** Cheating, plagiarism and fabrication of data are unacceptable practices both in this course and in science more generally. All of your work should be your own and only your own unless it is explicitly assigned and completed as a group. I do not accept assignments written for other classes. Cheating, plagiarism or data fabrication will result in a course grade of F and possible referral to the University Disciplinary and Honor Code Committee. Also see the UAF Student Code of Conduct at [http://uaf.edu/catalog/current/academics/regs3.html](http://uaf.edu/catalog/current/academics/regs3.html). If you have any doubt about whether a particular action constitutes cheating, plagiarism or fabrication of data, please seek clarification from the course instructor.

Evaluation

Successful completion of this class will require turning in all of the assignments on time. Each assignment is weighted as indicated below:

- Research proposal 10%
- Background review 20%
- Analysis 30%
- Research report 40%

Overall course grades will be assigned on the following scale

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<thead>
<tr>
<th>Numerical Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90.0-100%</td>
<td>A</td>
</tr>
<tr>
<td>80.0-89.9</td>
<td>B</td>
</tr>
<tr>
<td>70.0-79.9</td>
<td>C</td>
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<tr>
<td>60.0-69.9</td>
<td>D</td>
</tr>
<tr>
<td>below 60</td>
<td>F</td>
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Support Services

Students seeking additional help should discuss their concerns or needs directly with the instructor.

Disabilities Services

Any student needing accommodation of a disability should provide me with a letter from the Office of Disability Services within the first two weeks of class. The Office of Disability Services ([http://www.uaf.edu/disability/](http://www.uaf.edu/disability/)) also requires students contact them at least 3 days in advance of any exam for which they need special arrangements.