BIOLOGY 481

Experimental Evolutionary Ecology (E3)

Lecture: 132 HCK, Tues/Thurs, 3:00-4:20pm
Labs: 346 HCK, Tues, 8:30am-10:20am, 10:30am-12:20pm *OR* 12:30pm-2:20pm
Class website: http://depts.washington.edu/kerrpost/Bio481/HomePage

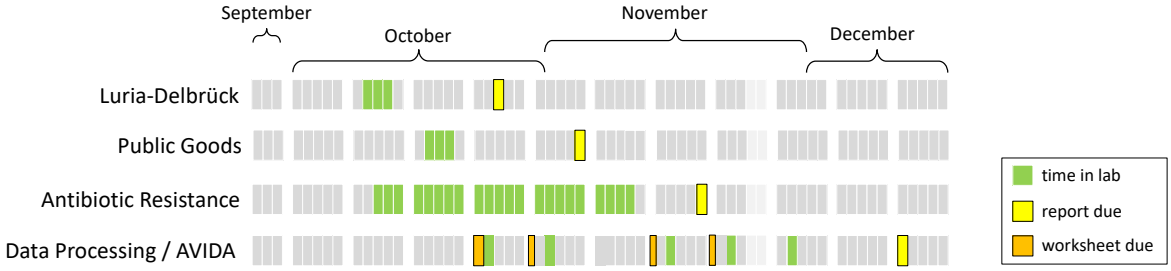
***Class Schedule*:**

Date	Day	Lecture Topic	Instructor	Lab Topic
Sep. 29	Thursday	Course Overview	Kerr	
Oct. 4	Tuesday	The Nature of Selection	Kerr	Orientation Lab
Oct. 6	Thursday	The Nature of Mutation	Kerr	
Oct. 11	Tuesday	Tradeoffs and Diversity	Kerr	Luria-Delbrück Lab (*start Antibiotic Resistance Lab*)
Oct. 13	Thursday	The Evolution of Cooperation	Kerr	
Oct. 18	Tuesday	Levels of Selection	Kerr	Public Goods Lab
Oct. 20	Thursday	Major Transitions	Kerr	
Oct. 25	Tuesday	Statistical Analysis	Kerr	AVIDA 0 / Data Processing
Oct. 27	Thursday	Historical Contingency	Kerr	
Nov. 1	Tuesday	Adaptive Landscapes	Kerr	AVIDA 1
Nov. 3	Thursday	The Problem of Drug Resistance	Kerr	
Nov. 8	Tuesday	The Evolution of Virulence	Kerr	Antibiotic Resistance Lab
Nov. 10	Thursday	Case Study: Mathematical modeling of disease	Bozic / Feder	
Nov. 15	Tuesday	Case Study: Horizontal Gene Transfer	Kerr	AVIDA 2 / Data Processing
Nov. 17	Thursday	Case Study: Rock-Paper-Scissors and Restraint	Kerr	
Nov. 22	Tuesday	Case Study: AVIDA and the Evolution of Complexity	Kerr	AVIDA 3
Nov. 24	Thursday	Thanksgiving		
Nov. 29	Tuesday	The Evolution of Plasticity	Kerr	AVIDA / Stats / Practice Session
Dec. 1	Thursday	Niche Construction	Kerr	
Dec. 6	Tuesday	Current Research Symposium	UW Grads	
Dec. 8	Thursday	Final Presentations	You	Final Presentations

Labs:

In the labs, you will be working in groups of four or five (you will choose these groups during the "Orientation Lab" on Oct. 4). Several of these labs will require (at least part of) your group to come to the laboratory outside of class. For instance, the Antibiotic Resistance Lab (in which your group will be evolving bacteria) runs for a total of 29 days. Thus, every day during these 29 days (excluding weekends), at least one member of your group must spend about 15 minutes in the lab transferring bacterial cultures. Below are a table and a schematic that give the start and end dates for each of the labs. The dates the lab reports are due are also listed. These reports should be submitted on-line (follow the link on the side bar of the class website) by **11:59pm** of the listed date (with the exception of the AVIDA handouts, which are due at **5pm**).

Lab	Start Date	End Date	Due Dates
Orientation Lab	Oct. 4	Oct. 4	
Luria-Delbrück Lab	Oct. 11	Oct. 13	Wednesday, Oct. 26 (Lab Report)
Public Goods Lab	Oct. 18	Oct. 20	Friday, Nov. 4 (Lab Report)
Data Processing	Oct. 25	Oct. 25	Monday, Oct. 24 (Google Practice Sheet: *before lab*)
Antibiotic Resistance Lab	Oct. 12	Nov. 10	Friday, Nov. 18 (Lab Report)
AVIDA Lab	Oct. 25	Nov. 22	5pm on Sunday, Oct 30 (Experimental Ideas Handout) 5pm on Sunday, Nov. 13 (Experimental Plan Handout) 5pm on Sunday, Nov. 20 (Experimental Re-Design Handout) Monday, Dec. 12 (Group Lab Report)
Final Presentations	Dec. 8	Dec. 8	



Grading:

The table below shows how the 150 total possible points for the course will be awarded. There are no formal exams in the course.

	Total Points
Lab Reports (12 points each)	48
Final Presentation (graded, in part, by other lab groups)	30
In-Class Questions (using Poll Everywhere)	25
Reading Comprehension Surveys	18
Pre-Lab Assignments (3 points each)	12
Participation (in lecture, lab, discussion boards, and with instructors)	8
Peer evaluation (by your lab group mates)	5
Out-of-class talk summary	4

Final grades will be calculated in the following manner, which assures that all students who master the material in the course will receive a good grade. Indeed, it is perfectly possible for everyone in the class to get a 4.0. We

assure you that this outcome would please all of us! The 4.0 grade will be set at the 95th percentile of point totals for the whole class. For example, if our class has 75 students, anyone having at least as many points as the top 4 students in the class will get a 4.0. To get a passing grade (0.7) you must get ½ of the possible points in the class. The point scores between the grades of 4.0 and 0.7 will be divided into approximately equal intervals to assign the remaining grades.

Lab Reports (≈32% of your grade):

Most lab reports are between 4 and 8 pages. Each lab report should begin with a few paragraphs (no more than 1 page) discussing, in your own words, the central aim of the lab. If the lab involved methods not laid out in a protocol (namely the AVIDA lab), then you should describe your experimental methods next. You should then present your data **either in a graph or in tabular form**. Then you should discuss and interpret your data. Specifically, you should discuss what the data means, showing any relevant calculations (long-hand is fine) and performing any statistical tests (if we've talked about them). You should share any errors in the execution of the experimental protocol, and suggest further experimentation that you think relevant. Finally, there will be about 5 questions to answer at the end of most of the labs. Your answers should be both succinct and complete (provide answers to each question, even if the question was addressed earlier in your report). Some labs will pose a "bonus question". This is worth 1 point if answered correctly. These bonus questions are meant to be challenging.

Lab reports will be scored for content, clarity, and style. With the exception of the AVIDA lab report, **all lab reports are to be *individual* efforts**. You should feel free to discuss your data and questions with the instructor, the TAs/PFs, your lab group, and other lab groups, but the writing must be your own. Proper attribution must be given to all sources of ideas, text, and data. You should know and follow the UW policies regarding plagiarism and other academic misconduct. Your name, email address, group name, and lab title should appear at the top of the first page (it doesn't hurt for your name to be in the header on every page). Please use 12 pt. font, single-spaced, with 1 inch margins. Any figures or tables should be clearly organized and should have legends. The lab report must be submitted online (follow the link on the side bar of the class website). The lab reports are due by **11:59pm** on the day listed in the above table.

Each lab group will meet with their assigned peer facilitator on Oct. 20, Oct. 21, or Oct. 24 (before the first lab report is due). This meeting will be to discuss the format of the lab reports generally and to address any questions. There are a total of four lab reports to turn in over the quarter.

In-Class Questions (≈17% of your grade):

The weekly questions (using Poll Everywhere) will be short (usually less than 5 minutes) and will be given every Tuesday and Thursday during lecture and sometimes during lab. The lecture questions will cover any assigned reading. The lab questions will cover the lab protocol(s) for the current lab(s). These questions should not cause you any undue stress—if you have read the relevant material, they should be fairly easy for you. Sometimes we will post some hints (with the online reading comprehension questions—see below).

Final Presentation (≈20% of your grade):

During the final class of the quarter, each lab group will give a final presentation that will last 18 minutes (including questions). Each group will be (randomly) assigned to present one of the labs executed during the quarter. Each group member should speak during the presentation. We suggest that you aim to spend 16 minutes on the presentation and allow 2 minutes for questions. You might organize your presentation as follows (where each group member could speak for 3-4 minutes):

1) Introduction to the Ecological or Evolutionary Concept(s)
2) Overview of the Experiment (Design & Execution)
3) Presentation of the Data and Interpretation
4) General Implications of Results for Original Concept(s)

Presentations will be scored for content, clarity, and effective use of visual aids in conveying information. PowerPoint slides (or equivalent) are strongly recommended. We also strongly recommend that you practice your presentation as a group (to work out transitions and timing). At least part of your grade for this final project will come from the evaluations of other laboratory groups.

Each lab group will meet with their assigned peer facilitator on Nov. 30, Dec. 1, Dec. 2, Dec. 5, or Dec. 6 (before the final presentation). This meeting will be to discuss the format of the presentation generally and to address any lingering questions. We recommend that the group runs through a version of the presentation with their peer facilitator during this meeting.

Reading Comprehension Surveys (≈12% of your grade)

Comprehension of the readings, including lab protocols, will be assessed on-line (each worth 1 point). (Note all readings and protocols are provided on our course website for download). This will occur through canvas quizzes, which are due at **11:59pm** the day before the lecture or lab covering the assigned reading. Follow the link on the side bar of the class website.

Pre-lab Assignments (≈8% of your grade):

Worksheets for the AVIDA Lab and Data Analysis Lab (Google Practice Sheet) will also be collected online, each worth 3 points. These worksheets must be submitted by **5:00pm** (AVIDA Lab) or **11:59pm** (Data Analysis Lab) on the day listed in the above table.

Participation (≈7% of your grade):

The instructors and TAs will monitor your level of participation during lecture, lab, on-line discussions, office hours, group projects, as well as meetings with your peer facilitators. We would like all students to participate in at least one of these venues, but there is certainly no expectation that students will participate in all venues (e.g., we recognize that some students feel more comfortable asking questions in class, while others prefer to do so on a discussion board, while others prefer to connect during office hours). Participation can involve many different things (asking questions, answering questions, posting ideas on discussion boards, volunteering to perform extra tasks for labs, etc.) and can occur in many different ways (on-line, virtually, in-person, etc.).

Peer evaluation (≈3% of your grade):

You will be doing several group lab projects during the quarter, and your fellow group members are counting on you to participate (both in, and outside of, the laboratory sessions). At the end of the quarter your lab group mates will assign you a grade for the quality of your participation. Similarly, you will evaluate your lab group mates. All evaluations will be done online before Dec. 12, **11:59pm** (an email will be sent towards the end of the quarter about this).

Out-of-class Talk Summary (≈3% of your grade):

In order for you to get exposure to current topics within biology, we are asking you to attend one research talk outside of class. There will be many opportunities throughout the quarter (and a listing of links to departmental seminar series can be found by following the out-of-class talks link on the class website). After attending the talk, you will write a short summary (**no more than 1 page**). You will want to include the following information:

- Name of presenter, title of presentation, and the date of the talk
- A brief summary of the talk itself (including the question(s) driving the research, the experiments or data relevant to exploring the question(s), and the presenter's interpretation of the results). This should be no more than a few paragraphs.
- Pose a question that the talk stimulated for you

This summary is due on Dec. 8.

Instructional Team:

Name	Role	Email	Office / Office Hours
Ben Kerr	Instructor	kerrb@uw.edu	Via Zoom / Thursdays, 4:35-5:30pm (or by appointment)
Elizabeth Duan	TA	esd4@uw.edu	LSB5 Kitchen area / by appointment
Nate Grassi	TA	ngrassi@uw.edu	LSB5 Kitchen area / by appointment
Chenxi Liu	TA	chenxi94@uw.edu	LSB5 Kitchen area / by appointment
Anusha Aggarwal	PF	aa11557@uw.edu	
Alisha Foster	PF	alisha826@gmail.com	
Jason Gao	PF	tempy48@uw.edu	
Shivani Hargunani	PF	shivanihargunani@gmail.com	
Maya Hari Abhyankar	PF	mayaa9@uw.edu	
Makayla Hsu	PF	mahsu@uw.edu	
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Felicia Tsai	PF	prox@uw.edu	
Dave Young	PF	dyoun200@gmail.com	
Tara Young	PF	taramyou@uw.edu	

Accommodations for Absences:

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Faculty Syllabus Guidelines and Resources. Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form available at:

https://registrar.washington.edu/students/religious-accommodations-request/

COVID-specific policies:

UW-specific guidance:
Following UW guidance, this class is conducted in-person. Students are expected to participate during lecture and lab to fully benefit from course activities and meet the course's learning objectives. Our working assumption is that students registering for this class are planning to attend in-person. The current UW policy recommends all individuals to wear a face covering indoors, regardless of their vaccination status (the instructional team will inform students if there is a change in UW policy). In order to further protect fellow students, faculty, and staff, students who feel ill, exhibit possible COVID symptoms, or test positive for COVID should not physically come to class.

Virtual lecture and make-up work:
For students not feeling well enough to come into lecture, but feeling well enough to virtually attend, we will plan to host the lecture at this Zoom link. If you attend lecture virtually, you can still ask and answer questions as well as answer in-class questions using Poll Everywhere. If you are not feeling well enough to attend the class in any format (either in-person and virtual options), first and foremost, please take care of yourself. If possible, please inform the instructor as soon as you are able in the case of an unexpected absence. We will arrange a way to make up any missed work.

Virtual lab and make-up work:
There are four "wet-labs" (Oct. 4, Oct. 11, Oct. 18 and Nov. 8). For an optimal learning experience, students should aim to attend these four labs in-person. For the other "dry-labs," there is a bit more flexibility for remote work. For students not feeling well enough to come into lab, but feeling well enough to virtually attend, we will allow a member of the student's lab group to host the physically absent student via Zoom on their laptop, tablet or phone (the idea would be for the student to see the procedures and interact with their lab mates). If you are not feeling well enough to attend lab in any format (either in-person and virtual options), first and foremost, please take care of yourself. If possible, please inform the TA and your lab group as soon as you are able in the case of an unexpected absence. We will arrange a way to make up any missed work.

Readiness to accommodate potential change in teaching format:
By its very nature, the course of the current pandemic is unpredictable. If needed, elements of this course (or the entire course itself) may change to an on-line format. This may follow new UW directives, or may occur due to health issues of students, staff or instructors. In the event of a change in format, you will be given full instructions via email with all the details. We do assume that all students have access to sufficient WiFi bandwidth to participate during class periods via Zoom, if needed. Our entire instructional team wants to create a safe and effective learning environment for all the students in this course and we will aim to be completely transparent about the motivation behind any needed changes.

Please communicate any concerns to us:
If you have health or safety concerns, please feel free to contact the course instructor, the teaching assistants, or DRS. We realize the past few years have been an exceptionally challenging time for all of you, and we will work hard to be as sensitive as possible to your needs as we continue the transition back into the classroom.

The Expected Form of Interaction in this Course:

Throughout lecture, labs and on our discussion boards, we will all benefit tremendously from an atmosphere in which the ideas and perspectives of all individuals involved in this course can be shared with consideration and respect. Meaningful and productive dialogue requires a commitment to civility and a willingness to listen to each other. Our entire instructional team is dedicated to promoting an environment in which respect for individual differences is maintained and in which everyone can benefit from courteous and constructive exchange of viewpoints.