

BIOS 1220: The Biology of Sex and Death – Laboratory Syllabus Fall 2021

Covid-19 Information: This course meets in person and has required attendance. Students in quarantine will be accommodated via synchronous virtual meetings. *Students in quarantine are expected to participate fully via synchronous remote meeting.* In the event of a transition to hybrid or fully remote instruction, required in-person activities will be replaced with hybrid touchpoints or remote activities of equivalent point value. Should the course instructor fall sick, another instructor will take over the course. All communication about contingencies will happen via Canvas Announcements.

Section A1: Mondays 12:30-3:15p; Clough 487

Section A2: Mondays 3:30-6:15p; Clough 487

Section A3: Tuesdays 12:30-3:15p; Clough 487

Instructor

Shana Kerr, PhD

Email

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Virtual drop-in hours

Mondays 11am-12pm

<https://bluejeans.com/382344651/9051>

Teaching Assistants

Kelly Eick

Taraji Long

Kelton Southard

Sections

A1, A2

A1, A3

A2, A3

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This syllabus and schedule are subject to change.

Course Description: The laboratory component of BIOS 1220, the Biology of Sex and Death, provides an opportunity for you to practice biology as a scientist to complement lecture content and activities. In lab, you will collaboratively design and conduct experiments to test hypotheses that you develop about biological questions surrounding life, sex, disease, and death. You will also critically analyze, graphically represent, and communicate the results of your experiments, to ultimately determine whether your data can be used to add new knowledge to our understanding of the biological world.

Laboratory Learning Objectives: Upon successful completion of this course, students will be able to:

1. Perform all steps of the scientific method including:
 - a. Develop a testable (falsifiable) hypothesis
 - b. Design and carry out an appropriate experimental design to test a hypothesis
 - c. Select and use an appropriate statistical test to analyze experimental data
 - d. Create appropriate visual representation (graph, table, etc) to effectively present analyzed results
 - e. Interpret analyzed results to support or reject a hypothesis
 - f. Effectively and convincingly communicate experimental findings and interpretations
2. Critique the effectiveness of and offer improvements for a graphical representation of scientific data

Covid-19 Mitigation: This is an unprecedented time. We all agree that the best way for you to learn is face-to-face. If we are required to move to an online format because of a covid outbreak, we are able to help you learn the course content remotely. Whether we meet in-person versus remotely could change depending upon health status of individuals in classroom. You have a definite stake in your personal health and the community's health.

Our expectation is that everyone who is eligible will be vaccinated; vaccination significantly reduces likelihood of severe disease, including from the delta variant of SARS-CoV-2. **Because the delta variant can be spread by vaccinated individuals, we also expect that everyone who is able to should wear a mask, correctly covering mouth and nose, when indoors and throughout the entire course meeting time.** Both of these expectations are based on current CDC guidance. As that guidance is updated, we will communicate any new expectations.

Weekly asymptomatic surveillance testing should be part of everyone's regular routine, regardless of vaccination status. Details are here: <https://health.gatech.edu/coronavirus/testing>.

Syllabus last revised: 10/18/2021

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Laboratory Safety: For every wet (experimental) lab, you must wear your lab coat, long pants, close-toed shoes, and tie back long hair. Safety policies are mandated by Georgia Tech institutional rules to keep everyone safe. At the beginning of each lab, your TA will alert you to all of the potential hazards. You will lose all of your participation points for that lab if you violate any safety policies. The following safety policies are non-negotiable:

- You must wear shoes that cover your feet entirely (i.e., no flip flops, ballet slippers, or sandals). You will not be allowed to enter the lab without appropriate footwear.
- No food or drinks, including water bottles.
- No cell phone use, including texting (phones must be silenced and off the lab bench).
- Clean up your lab station at the end of lab and report any mess left behind from previous lab sections to your TA.
- Properly dispose of trash, glassware, and biohazard waste. Other people's safety may be compromised by your negligence.
- During "wet labs" (experimental labs) you must wear long pants to the ankle, your lab coat and safety glasses, and long hair should be tied back. Your TAs will indicate when gloves are necessary. **Students must provide their own lab coats and safety classes.** Safety glasses or goggles must offer side splash protection in order to comply with lab safety requirements; regular eye-glasses are NOT sufficient, and safety glasses or goggles must be worn over regular prescription glasses. Compliant safety glasses or goggles can be purchased from the Georgia Tech Bookstore. Disposable nitrile gloves are provided in lab.
- Follow additional safety procedures for specific lab activities as indicated by your TA.
- **Report all injuries or accidents to your TA immediately.**

In lab this semester, we will work with two species of bacteria and one eukaryote: *Escherichia coli* (ATCC 11303), *Staphylococcus epidermidis* (ATCC 14990), and *Saccharomyces cerevisiae* (baker's yeast). Persons who are immune-compromised (including those who are pregnant or may become pregnant) and students living with or caring for an immune-compromised individual are advised to consult with your physician to determine the appropriate level of participation in the lab. Should your physician determine that you should not participate in this lab, please have him or her write a note stating the concerns. Alternative accommodations can be made if needed.

Attendance and Absences: This course meets in person, and there is no mechanism to "make-up" a missed lab. While expect each student to attend every lab and to be present for the entire lab period, we are in a pandemic. If you are sick, in isolation for covid, or in quarantine for possible covid exposure, we ask that you not come to class. Instead, email your two TAs and Dr. Kerr immediately to communicate that you will not be in class and plan to participate remotely on a bluejeans session with your teammates, if you are well enough to do so. While far from ideal, this is the safest solution we can implement in the current circumstances.

For non-illness related reasons, if you must miss a laboratory, notify your two TAs and Dr. Kerr by email as soon as possible, preferably before the missed lab. There will be no make-up laboratories. Vacation, work commitments, and social events are not acceptable reasons to miss lab. Examples of legitimate reasons to miss a lab include serious illness, illness or death in your immediate family, and participation in official university activities. *You will be required to provide documentation for excused absences.* Medical documentation should be sent to the Dean of Students office, not to your course instructors: https://gatech-advocate.symplicity.com/care_report/index.php/pid201106

- *Excused absences:* Documented excused absences may include your illness, an illness or death in your immediate family, and participation in official university activities. Missed and makeup lab assignments will be due within one week of the original due date. For excused absences, missed and makeup work must be submitted within one week in order to avoid missed participation and other assignment credits. **It is your responsibility to contact your group members to obtain necessary data from the missed lab exercise.**

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- *Unexcused absences:* There are no make-up opportunities for unexcused absences. **An unexcused lab results in a loss of any points associated with that day's lab and a half-letter grade reduction of your final course grade.**

Plagiarism and other academic misconduct will not be tolerated: Academic misconduct includes cheating, lying about course matters, plagiarism, submitting someone else's work as your own, stealing classroom materials, or helping others commit a violation of the Honor Code. Plagiarism includes representing the words or ideas of others as your own. Plagiarism will result in a grade of "o" for that assignment, and possibility other penalties and sanctions. Your conduct is expected to conform to the Georgia Tech Honor Code (<http://www.honor.gatech.edu>). Please familiarize yourself with its expectations and responsibilities.

Late work Policy: Assignments turned in late without prior permission from the instructors will be marked down one letter grade each day they are late. *Pre-lab assignments are not accepted late for credit, except in the case of an excused absence.* Late assignments must be submitted within one week or they will not be graded.

Additional resources to help you be successful in Biology 1220 Lab: If you have no experience with statistics and/or creating graphs, we encourage you to use the Statistics and Graphing Resources which you will find on Canvas. You may find the following statistics tutorial on t-tests and chi-square tests at MathBench to be helpful: <http://www.mathbench.umd.edu/> If you're interested in additional resources on writing, check out the following web resources: <http://owl.english.purdue.edu/> and <http://labwrite.ncsu.edu/>

Grades: Your lab grade is comprised of the components described below:

Individual Assignments:

Pre-lab assignments*	20%
Lab Participation (includes activities below)	15%
On-task attendance during lab	
Contributions to group projects	
Self- and group evaluations	
Peer feedback on group presentations	
Graph Evaluations	15%
Total Individual Assignments:	50%

Group Assignments

Experimental Design Plans	25%
Research Presentations	25%
Total Group Assignments:	50%

*Pre-labs are graded for thoughtful completion rather than accuracy. Late pre-labs will not be accepted without approval for an excused absence.

Together these assignments comprise 100% of the lab grade, which is 25% of your overall course grade. **Please note that the grades on the Canvas page are for your record-keeping only; Canvas will not calculate your lab course grade accurately.**

Pre-lab assignments:

Pre-labs are designed to help you to prepare for lab and will be graded for thoughtful completion rather than accuracy. Pre-lab assignments will be posted to Canvas no later than Thursday before your next lab, and can be found under Pre-labs or Resources (as noted in Schedule below). Pre-labs will be completed online and must be completed before the start of lab. It is your responsibility to read the lab in advance (as indicated on the Schedule). Late pre-labs will not be accepted, except in the case of an excused absence.

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Lab participation:

Each class period, we will assess your participation in class. Participation includes three components:

- 1) Participation in each laboratory activity; 3 points per lab: You will be assessed by your TAs for each laboratory exercise. Group work is an essential part of lab. If you are >5 minutes late to lab, you will lose 1 participation point for that lab. If you are present but not on task or productively working with your group, you may lose up to 2 points of participation for that lab. A safety violation or an unexcused absence will result in the loss of all participation points for that lab.
- 2) Complete self-evaluation and evaluation of your group members' contributions to the group efforts; 5 points each evaluation: You will be assessed by your group members and yourself at the midpoint and end of the semester for your contributions to the group efforts
- 3) Providing feedback to other groups on their group presentations; 5 points each presentation You will individually and anonymously provide constructive feedback on the research presentations presented by other groups. Your evaluation feedback will be shared anonymously with the group.

Experimental Design Plans:

For each experimental investigation, you will work with your team to fill out and upload an experimental design plan which consists of your research question, rationale and hypothesis, detailed experimental protocol, and your data analysis and communication plans. In some cases you may be asked to revise and resubmit Experimental Design Plans. All group members must contribute equally to these worksheets. All members will sign at the end of the worksheet signifying their approval of the work and verifying their contribution to it. If you do not contribute equally towards your group, you will face penalties, including possibly receiving a grade of "0" for that assignment. Experimental Design Plans must be completed during scheduled class time.

Group Research Presentations:

At the conclusion of each experimental investigation, you will deliver your findings to the class in the form of short PowerPoint presentations. Oral presentations are a great way to practice science communication skills. Each research presentation is expected to include a title slide, research question, rationale and hypothesis, detailed experimental methodology (independent, dependent variables, controls), data analysis, at least one graph, conclusion, sources of error, and next steps. Ideas and information that was obtained from other sources must be cited. Details for presentation expectations will be posted to Canvas.

Graph Evaluations:

Throughout the semester, you will evaluate graphs that your group constructed for your PowerPoint presentation or graphs from the published scientific literature or popular media. The goal of these evaluations is to help you become a critical consumer of graphical information so that you can create better visual data representations for future assignments connected to this course, your future courses, and your future career.

Concerns about grades:

There is no extra credit for Biology 1220 lab. We think the distribution of points possible to earn is fair, and we feel strongly about giving you credit for your weekly participation in lab, since doing lab can be a lot of work. Your lab grade is 25% of the BIOS 1220 final course grade. It is your responsibility to keep up to date with grades posted on Canvas to confirm that your work is correctly reflected in the assigned grade. If a grade on Canvas appears to be inaccurate, e.g., a zero entered for an assignment you turned in, etc., contact your TAs within 3 weeks of the assignment due date to request a grade re-evaluation. You must submit your request in writing (email), include your rationale and justification for requesting the regrade in your request.

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This schedule is subject to change

Week	Dates	Lab activities and assignments due during lab	Assignment due before lab (via Canvas)
1	23/24 Aug	<i>No labs during first week of classes</i>	
2	30/31 Aug	Pre-test / Scientific method/ EDP discussion and practice / Figure Analysis/Graph evaluation 1 / CATME Team-Maker/ Intro to Antimicrobial Properties of Foods with Demo	Pre-lab 1: Scientific Inquiry assigned reading; Incoming knowledge on microbes
3	6/7- Sept	<i>Labor Day – no labs</i>	
4	13/14- Sep	Team contract / Intro to statistical analysis / Antimicrobial EDP / Antimicrobial Experiments	Pre-lab 2: Antimicrobial Properties of Foods and Spices; Inferential Statistics
5	20/21 Sept	JMP Activity and Demo / Statistics Activity / Antimicrobial Data Analysis / Antimicrobial PPT	Pre-lab 3: Graphing in JMP ; Statistical Analysis in JMP; ZOI Analysis
6	27/28- Sept	Antimicrobial Properties Presentations / Intro to Fruit Flies with Demo / Graph Evaluation 2	Pre-lab 4: Graphing and Statistical Analysis 1
7	4/5 Oct	Hypothesis Testing Activity / Fruit Fly Chemoattractant and Trap Design EDP /Graph Evaluation 3	Pre-lab 5: Hypothesis Testing and Fruit Fly Sensory Ecology Fruit Fly Trap Design
8	11/12 Oct	<i>Fall Break - no classes</i>	
9	18/19 Oct	Chemoattractant and Trap Design Building / Fruit Fly Trap Experiments and Data Collection	Pre-lab 6: Self Reflection on Scientific Process and Team Evaluations
10	25/26 Oct	Fruit Fly Trap Data Analysis/ Fruit Fly PPT/ Fruit Fly Presentations	Pre-lab 7 Graphing and statistical analysis 2
11	1/2 Nov	Graph Evaluation 4 / Intro to Fiddler Crabs / Fiddler Crab EDP and Ethogram Development	Pre-lab 8: Fiddler Crab Behavior and Ethograms
12	8/9 Nov	Fiddler Crab Experiments / Ethogram Revisions / Graph Evaluation 5	Pre-lab 9: Graph evaluation
13	15/16 Nov	Fiddler Crabs Experiments repeat (if needed)/Fiddler Crab Data Analysis/ Fiddler Crab PPT	Pre-lab 10: Ethograms and Behavioral Data Analysis
14	22/23 Nov	<i>No lab meeting during Thanksgiving break</i>	
15	29/30 Nov	Fiddler Crabs Presentations/ Graph Evaluation 6 / Post-Test / Course Wrap-Up	Pre-lab 11: Statistical Analysis 3 and End of Semester Team Evaluations
16	6/7 Dec	<i>No lab meeting during final instructional days</i>	