**BIOS 1220: The Biology of Sex and Death**

**Meeting times:**

Lecture: Tuesday & Thursday 9:35-10:55 am CULC 102

Lab: Section B1 Monday 12:10-2:50 pm CULC 483

Section B2 Monday 3:05-5:45 pm CULC 483

Section B3 Tuesday 12:00-2:40 pm CULC 483

**Course Purpose and Objectives:** This course is designed to teach biology through the lens of the formation and collapse of biological systems, organized around questions pertaining to life, sex, and death. Sex and death are two constants of living organisms and are a consequence of how organisms interact with each other and the environment. We’ll explore questions such as why sex exists, how sexual reproduction differs between organisms, and what are the costs and benefits of sex. We will also consider modes of cancer and infectious disease, how genetic modification is used in agriculture, and how climate change and land use decisions by humans cause extinction, the death of entire species.

Students will be able to demonstrate the ability to obtain, analyze, interpret, and criticize qualitative observations and quantitative measurements to explain natural phenomena and to test hypotheses. Lecture time will be spent on of a variety of team-based activities designed to allow students to discuss, clarify, and apply new ideas by answering questions, drawing diagrams, analyzing science news articles and figures from the primary literature, and explaining phenomena in the context of biological principles. Specifically, by the end of this course, you will be able to:

1. Acquire, explain, apply, and evaluate basic biological information surrounding life, sex, and death. (Biology content knowledge)
2. Know and apply the scientific methodology, including a recognition of scientific uncertainty. (Scientific Method)
3. Work effectively on teams to present, explain, and critique your results and the results of others. (Teamwork & Scientific Method)
4. Explore a dataset and communicate results to connect ideas from biology to an authentic problem that resonates with you personally, intellectually, or professionally.  (Authenticity & Scientific Method)
5. Reflect upon how scientific thinking about biological topics can inform decisions, including bioethical decisions. (Reflection)

**Pre-requisites and the General Education Core:** This course is a 4-credit hour lecture and lab course. It has no pre-requisites and fulfills a lab science elective for non-Biology majors. Students who decide to change majors into Biology after taking this course may consult with the course instructor and their academic advisor to take an advanced standing exam to substitute this course for Biological Principles BIOS 1107 (and 1107L/1207L). This course is not a recommended substitute for BIOS 1107 (and 1107L/1207L) or BIOS 1108 (and 1108L/1208L) for Pre-Health students seeking to prepare for medical training and the MCAT. This course is not intended for declared Biology majors.

**Instructors:**

**Dr. Chrissy Spencer**, [chrissy.spencer@biology.gatech.edu](mailto:chrissy.spencer@biology.gatech.edu) 404 385 0539

Office Hours: Mondays & Wednesdays 2-4 pm and by appointment in CULC 474C

*Dr. Spencer is the point of contact for all lecture course concerns.*

**Dr. Brian Hammer**, [brian.hammer@biology.gatech.edu](mailto:brian.hammer@biology.gatech.edu) 404 385 7701

Office Hours: Tuesdays 1-3 pm and by appointment in Cherry Emerson 223

**Dr. Shana Kerr**, [shana.kerr@biosci.gatech.edu](mailto:shana.kerr@biosci.gatech.edu) 404 385 0065

Office hours: Wednesdays 11:30 am-1 pm in Cherry Emerson A114

*Dr. Kerr is the point of contact for all laboratory concerns, including absences from lab. See the lab syllabus for details.*

**Teaching Assistant Alli Wyman,** [awyman6@gatech.edu](mailto:awyman6@gatech.edu)

Office hours: Wednesdays 12-2 pm in CULC 365

*Alli is a third year premed Biology major and second semester TA. She is involved in the Georgia Tech Chamber Choir and volunteers at Children’s Healthcare of Atlanta.*

**Course Materials:**

* Online Textbook at [bio1220.biology.gatech.edu](file:///C:\Users\aangra3\Desktop\bio1220.biology.gatech.edu)
* Learning Catalytics subscription at [www.learningcatalytics.com](http://www.learningcatalytics.com)
  + If you already have a Mastering or MyLab account for another course, check first to see if you have free access to Learning Catalytics.
  + If not, purchase for $12 for the semester at [www.learningcatalytics.com](http://www.learningcatalytics.com). Select the Register link, indicate you are a student, and select “No, I am not using Learning Catalytics with a MyLab or Mastering product”)
* Lab Coat (long sleeve, 100% cotton, available at Georgia Tech Bookstore or from the CULC 5th floor Chemistry Stockroom. Please bring your lab coat to lab the first week.)

**Weekly Schedule:**

Most weeks, we will have the following **due dates** in this course. Please add these to your planner and block of your prep and study time to meet these deadlines.

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| --- | --- |
| **Day** | **Due** |
| Tuesday | IKE due at start of class |
| Thursday | IKE due at start of class; TEST during first 15 minutes of class |
| Sunday | HW due before midnight |

**Course Mechanics & Expectations:** Lecture time will be spent on of a variety of team-based activities designed to let you discuss, clarify, and apply new ideas by answering questions, drawing diagrams, analyzing primary literature, and explaining phenomena in the context of biological principles. We will spend class time on building your comprehension of the material you find the most difficult, based on pre-class assessments. You will play a prominent role in determining the focus of each day’s effort.

What is our role as instructors? Our goal is to increase your engagement and comprehension of course material during the class period. We will encourage you to be fearless in attempting class activities, and we will help you optimize your in class time as an opportunity for you to reveal your misconceptions and be corrected in real-time. Mini-lecture tutorials will be offered when needed. We will strive to balance your desire to hear from us as “experts” with our goal for you to become an expert yourself.

What is your role? Before class, read/watch/listen to the assigned preparatory material, attempt each pre-class assessment, create a notes template for class, and formulate any questions you want to ask. During class, you can expect to build your understanding through team activities and contribute to class discussions. Following class, there will be short homework assignments to give you an additional opportunity to ensure you’ve mastered the material. This course format will ask you to develop skills in identifying what information you need, and learning how to break down a complex problem into discreet and solvable parts. We expect you to demonstrate persistent learning by attending every class period, reading ahead, bringing appropriate notes that support quality participation during class, and taking personal responsibility for the success of both yourself and your team.

**Academic Honor Code and Plagiarism:** All students are expected to abide by the Academic Honor Code, which can be viewed online at [www.honor.gatech.edu](http://www.honor.gatech.edu). We take the Honor Code very seriously and are required to report any potential violations. Some specific examples of Honor Code violations include copying during exams, completing work while logged in as another student, and plagiarism. Everything that you write or create in this course, including lab reports, test answers, homework, and in-class work, must be original content created by you, not copied from another source. Copying the words or even the ideas of someone else is plagiarism. Any suspected plagiarism will be submitted to the Office of Student Integrity for evaluation.

**Learning Accommodations:** We will make classroom and laboratory accommodations for students with disabilities. These accommodations must be arranged in advance and in accordance with the [Office of Disability Services](http://disabilityservices.gatech.edu).

**Evaluation:** Your final grade will depend on the following combination of grades:

Pre-class Assignments: 5%

In-class Activity Assignments: 5%

Homework Assignments: 5%

Project: 10%

Tests: 35%

Final Exam: 15%

Laboratory: 25%

We will assign final letter grades using the following scale:

A: ≥ 90.0% B: ≥ 80.0% and < 90.0% C: ≥ 70.0% and < 80.0% D: ≥ 60.0% and < 70.0% F: < 60.0%

**Assignments:** To complete your pre-class and in-class activities and your weekly homework assignments, students are required to have a [Learning Catalytics](https://learningcatalytics.com/users/sign_up) account. Learning Catalytics can be purchased directly at <https://learningcatalytics.com/users/sign_up> or from the Georgia Tech Bookstore. To participate in class, you will need to bring an internet-ready laptop, tablet, or smartphone to class to earn participation points. Phone and computer use is restricted to class-related material, and off-task use may result in loss of participation points for that day. We will use learning catalytics on the first day of class, but assignments and sessions due before phase II registration closes (first Friday at 4 pm) are to test your account set up and for practice using the system and will not contribute toward your grade.

**Pre-class Incoming Knowledge Evaluation (IKE) assignments:** Before each class, we’ll expect you to complete the pre-class readings on the website. Once you’ve reviewed the material, log in to learning catalytics to complete a short Incoming Knowledge Evaluation (IKE). IKE sessions close at the start of class and will not be reopened for credit, but you can review closed sessions for study purposes. IKE questions are not often at the same level as you can expect to see on a test; instead, they help provide you with effective baseline knowledge to work up to test level questions in class. All IKE questions receive full credit for completion rather than correctness.

**Team In-Class Activity (TICA) assignments:** Data and our own experience show that attendance and deliberate attention in class correlate with performance and course grades. We will make our lecture materials available and urge you to download and print them for use in active note-taking during class. Questions presented in class are usually at the same level of difficulty as test questions, so attending class gives you practice for taking the tests. The In-Class Activity sessions in Learning Catalytics close at the end of class, with a few exceptions, and will not be reopened for credit, but you can review closed sessions for study purposes. All TICA questions receive full credit for completion rather than correctness.

**Homework:** Homework assignments will be made available each week in Learning Catalytics and are always due on Sundays at midnight. Homeworks close on Sunday at midnight, with few exceptions, and will not be reopened for credit, but you can review closed sessions for study purposes. Should a homework not close by Monday morning, please email Dr. Spencer so that she can manually close the assignment, releasing the answers. Homework questions are scored ½ for completion and ½ for correctness.

**Project:** Connecting the process of science to an authentic, real-world question can bring into focus how science can be relevant in our daily lives. Solidifying these connections helps us reflect on how science and scientific thinking can be helpful and contribute to decisions we will have to make at some point in the future. Citizen Science is one way that any citizen can contribute to data collection for problems large and small in biology. This semester we will explore various existing citizen science projects and each of you will contribute to one that is meaningful to you personally, intellectually, or professionally. As part of this, we will ask you to reflect upon how scientific thinking about biological topics can inform decisions in your lives. As a class, we will establish the project grading structure and final deliverable. Project workshop time is built into the schedule. Projects can be solo or with a partner. For any group work, the same grade will be assigned to both members of a group; each group member is fully responsible for all submitted project work.

**Tests and Final Exam**: *Short* tests held *weekly at the beginning of class* during the semester will be a mix of multiple choice, diagram/graph reading, and short answer questions. Test questions will be focused on recent material but as content knowledge deepens, some degree of cumulative recall is expected. The final exam, held during finals week, will be a cumulative exam. The lowest ***two*** test grades will be dropped. If you miss a test for any reason, you will receive a grade of 0 (zero) on that test unless you petition for an excused absence within 24 h of the start of the missed test, and we approve your petition. Petitions must be submitted by email to [chrissy.spencer@biology.gatech.edu](mailto:chrissy.spencer@biology.gatech.edu) and must include documentation of a legitimate reason for missing the test. You may submit your petition before the test if you know of your scheduling conflict in advance. Examples of legitimate reasons to miss a test include your illness, an illness or death in your immediate family, and participation in official university activities. Excused test grades will be replaced by the weighted average of your other tests in the course.

**Laboratory:** Labs begin in the second week of classes. Please consult the BIOL 1220 lab syllabus on Canvas for details.

**Bloopers and Gaffes:** This course explores many aspects of life, sex, and death, and we will try to present and discuss the material in a fair and balanced way, but everyone makes mistakes – especially when we are talking about a loaded subject such as sex for an entire semester. Faculty, TAs, and students will each need to do their best to choose words carefully and avoid offending others, and we apologize in advance for anything we say that you might find offensive or uncomfortable. We ask that everyone treat these subjects with respect but also with an open mind. Please let a faculty member know if you are upset by any of the content in the course and help us to refine the material with each passing year to make the course better than the year before.

**Intellectual Property:** With the exception of third-party material, course materials provided in BIOL 1220 are licensed under a Creative Commons Attribution-Non Commercial-Share Alike 4.0 International License. They are not to be re-distributed or re-purposed without express permission of the instructor. This includes the posting of course questions or notes to third party study sites.

**Academic Support**: Georgia Tech offers a variety of free learning and communications support options. Learn about free tutoring resources at www.success.gatech.edu or at the Center for Academic Success’s tutoring desk in Clough Commons 273. For assistance with revising lab reports or building and polishing a group project presentation, consult the Communications

Center (Clough Commons 447 or commlab.gatech.edu).

Additional resources for academic support include:

* Center for Academic Success (success.gatech.edu)
  + 1-to-1 tutoring (success.gatech.edu/1-1-tutoring)
  + Peer-Led Undergraduate Study (PLUS) (success.gatech.edu/tutoring/plus)
  + Academic coaching (success.gatech.edu/coaching)
* Residence Life's Learning Assistance Program
  + (housing.gatech.edu/learning-assistance-program)
  + Drop-in tutoring for many 1000 level courses
* OMED: Educational Services (http://omed.gatech.edu/programs/academic-support)
  + Group study sessions and tutoring programs
* Communication Center (http://www.communicationcenter.gatech.edu)
  + Individualized help with writing and multimedia projects
* Academic advisors for your major (http://advising.gatech.edu/)

**Personal Support**: In your time at Georgia Tech, you may find yourself in need of support. Below are some resources available on campus.

* The Dean of Students studentlife.gatech.edu/content/services; 404-894-6367;
  + Located in Smithgall Student Services Building on the 2nd floor
  + You also may request assistance at gatech-advocate.symplicity.com/care\_report/index.php/pid383662?
* Counseling Center: counseling.gatech.edu; 404-894-2575;
  + Located in Smithgall Student Services Building on the 2nd floor
  + Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention. Their website also includes links to state and national resources.
  + Students in crisis may walk in during business hours (8am-5pm, Monday through Friday) or contact the counselor on call after hours at 404-894-2204.
* Students’ Temporary Assistance and Resources (STAR):
  + studentlife.gatech.edu/content/need-help
  + Can assist with interview clothing, food, and housing needs.
* Stamps Health Services: health.gatech.edu; 404-894-1420
  + Primary care, pharmacy, women’s health, psychiatry, immunization and allergy, health promotion, and nutrition
* OMED Educational Services: www.omed.gatech.edu
* Women’s Resource Center: [www.womenscenter.gatech.edu](http://www.womenscenter.gatech.edu); 404-385-0230
* LGBTQIA Resource Center: lgbtqia.gatech.edu/; 404-385-2679
* Veteran’s Resource Center: veterans.gatech.edu/; 404-385-2067
* Georgia Tech Police: 404-894-2500

**Lecture Topics & Schedule (subject to change)**

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| **Date** | **Module** | **Who** | **Content Topic**  **(50 minutes)** | **Test/Assignment**  **(20 minutes\*)** | **HW due midnight** |
| 21-Aug | 1.01 | CS | Scientific Methodology | Syllabus details |  |
| 23-Aug | 1.02 | BH & SK | Life defined | Task: Beginning of life | HW 1 on Modules 1.01, 1.02 due Sunday |
| 28-Aug | 1.03 | CS | Biodiversity | Task: Notetaking |  |
| 30-Aug | 1.04 | CS | Tree Thinking | **Test 1** covers Modules 1.01, 1.02 (HW 1) | HW 2 on Modules 1.03, 1.04 due Sunday |
| 4-Sep | 1.05 | CS | Evolution by NS | Project: Citizen Science |  |
| 6-Sep | 1.06 | CS | Life Interacts with life | **Test 2** covers Modules 1.03, 1.04 (HW 2) | HW 3 on Modules 1.05, 1.06 due Sunday |
| 11-Sep | *–* | CS | *Synthesis (no new reading for today)* | Project: Citizen Science |  |
| 13-Sep | 1.07 | CS | Life interacts with non-life | Project: Citizen Science | HW 4 on Modules 1.07 due Sunday |
| 18-Sep | 2.01 | BH | Asexual Reproduction | Task: Project rubric & deliverable options |  |
| 20-Sep | 2.02 | BH | Sex (Meiosis) | **Test 3** covers Modules 1.05, 1.06, 1.07 (HW 3&4) | HW 5 on Modules 2.01, 2.02 due Sunday |
| 25-Sep | 2.03 | CS | Trait Inheritance | Project: Citizen Science |  |
| 27-Sep | 2.04 | CS | Sexual Dimorphism & Sexual Selection | Project: Project proposal due | HW 6 on Modules 2.03, 2.04 due Sunday |
| 2-Oct | 2.05 | BH | Mating Systems | Task: Sleep data |  |
| 4-Oct | 2.06 | BH | Human Reproductive Cycle | **Test 4** covers Modules 2.01, 2.02, 2.03 (HW 5&6) |  |
| *9-Oct* | *–* | *–* | *Fall Break* | *–* | HW 7 Modules 2.05, 2.06 due Tuesday! |
| 11-Oct | 2.07 | BH | Plant Reproduction & the food supply | Project: Project approvals & Guidelines | (no HW this Sunday) |
| 16-Oct | *–* | BH & CS | *Synthesis (no new reading for today)* | Project: Citizen Science |  |
| 18-Oct | 2.08 | BH | Gene expression and development | **Test 5** covers Modules 2.04, 2.05, 2.06 (HW 6&7) | HW 8 on Modules 2.07, 2.08 due Sunday |
| 23-Oct | 2.09 | BH | IVF and Gene Editing | Project: Citizen Science |  |
| **Date** | **Module** | **Who** | **Content Topic**  **(50 minutes)** | **Test/Assignment**  **(20 minutes\*)** | **HW due midnight** |
| 25-Oct | 2.10 | CS | Genetically Modified Organisms | **Test 6** covers Modules 2.07, 2.08, (HW 8) | HW 9 on Modules 2.09, 2.10 due Sunday |
| 30-Oct | 2.11 | CS | Biological Basis of Homosexuality | Project: Citizen Science |  |
| 1-Nov | 3.01 | CS | Senescence | **Test 7** covers Modules 2.09, 2.10 (HW 9) | (no HW this Sunday) |
| 6-Nov | 3.02 | BH | Heritable Disease | Project: Citizen Science |  |
| 8-Nov | 3.03 | CS | Infectious Disease Spread |  | HW 10 on Modules 3.01, 3.02, 3.03 due Sunday |
| 13-Nov | *–* | BH | *Project: Citizen Science (no new reading for today)* | Project: Citizen Science | **Project due** on Friday 16-Nov |
| 15-Nov | 3.04 | BH | Innate and Adaptive Immune Responses | **Test 8** covers Modules 3.01, 3.02, 3.03 (HW 10) |  |
| 20-Nov | 3.05 | BH | Immunization and Allergic Response | Task: TBD |  |
| *22-Nov* | *–* | *–* | *Thanksgiving Break* | *–* | HW 11 on Modules 3.04, 3.05 due Sunday |
| 27-Nov | 3.06 | BH | Cancer Biology | Task: TBD |  |
| 29-Nov | 3.07 | JM | Extinction (guest instructor Dr. Joe Mendelson, Zoo Atlanta) | **Test 9** covers Modules 3.04, 3.05 (HW 11) | (no HW this Sunday) |
| 4-Dec | 3.08 | BH & CS | *Synthesis (no new reading for today)* | Synthesis |  |
| 13-Dec | *–* |  | Final Exam (Thursday 13-Dec from 11:20 am – 1:20 pm) | **Final Exam** covers all modules, including 3.06–8  \* We will allot 2.5 hours for the final exam. |  |

**BIOS 1220: The Biology of Sex and Death Laboratory**

Course meeting location: Clough lab room 487

Section B1: Mondays 12:10-2:50 pm

Section B2: Mondays 3:05-5:45 pm

Section B3: Tuesdays 12:00-2:40 pm

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| **Instructor** | **Email** | **Office hours** |
| Shana Kerr, PhD | [shana.kerr@biosci.gatech.edu](mailto:shana.kerr@biosci.gatech.edu) | Thurs 1-2pm & by appointment  Cherry Emerson A114 |
| **Teaching Assistants** | **Email** | **Office hours** |
| Michael Ng – sections B1 and B2 | [sng32@gatech.edu](mailto:sng32@gatech.edu) | TBA |
| Matthew Toedt – sections B2 and B3 | [mtoedt7@gatech.edu](mailto:mtoedt7@gatech.edu) | TBA |
| Fiona Wood – sections B1 and B3 | [fionacwood@gatech.edu](mailto:fionacwood@gatech.edu) | TBA |

**Course Description:** The laboratory component of BIOS 122o, 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:
   1. Develop a testable (falsifiable) hypothesis
   2. Design and carry out an appropriate experimental design to test a hypothesis
   3. Select and use an appropriate statistical test to analyze experimental data
   4. Create appropriate tables, graphs, or other figures to effectively present analyzed results
   5. Interpret analyzed results to support or reject a hypothesis
   6. Effectively and convincingly communicate experimental findings and interpretations
2. Critique the effectiveness of and offer improvements for a graphical representation of scientific data

**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. Safety glasses and 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 various types of bacteria (*Bacillus subtilis (*ATCC 23857*), Serratia marcescens* (ATCC 23857)*,**Escherichia coli (*ATCC 11303*), Staphylococcus epidermidis (*ATCC 14990*)***.** 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.

**Absences:** You must attend your assigned lab section unless you have been given permission to attend another lab section to make up an excused absence. Contact your TAs as soon as you know that you will miss lab, preferably beforehand. We advise contacting your group members as well, to get data they may collect.

* *Excused absences:* Documented excused absences may include your illness, an illness or death in your immediate family, and participation in official university activities. Any missed lab assignments will be due within one week of the original due date. There is no penalty for an excused absence. **It is your responsibility to contact your group members to obtain necessary data from the missed lab exercise.**
* *Unexcused absences:* There are no make-up labs for unexcused absences. An unexcused lab results in a loss of participation points for 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 "0" 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.

**Additional resources to help you be successful in Biological Sciences 1220 Lab:** If you have no experience with statistics and/or creating graphs, we encourage you to use Appendices A and B in the lab manual as a resource, along with 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 10%

Lab Participation 15%

Graph Evaluations (4) 20%

Presentation peer review (4) 5%

**Total Individual Assignments: 50%**

**Group Assignments**

Experimental Design Worksheets (4) 25%

Experimental Results Presentations (4) 25%

**Total Group Assignments: 50%**

Please note that the grades on the Canvas Lab site are for your record-keeping only; Canvas may not calculate your lab course grade accurately.

**Pre-lab assignments:**

Pre-labs are designed to help you to prepare for lab. Pre-lab assignments will be posted on Canvas by the Wednesday 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 lab. It’s your responsibility to read the lab in advance (as indicated on the Schedule). There is no credit awarded for late pre-lab work, except in the case of an excused absence.

**Lab participation:**

You will be assessed by your TAs for each laboratory exercise (3 points per lab) and by your group members at the midpoint and end of the semester. Group work is an essential part of lab. If you are >10 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.

**Experimental Design Worksheets:**

1 for each inquiry experiment: Four times over the course of the semester, you will be asked to fill out and upload an experimental design worksheet 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 Worksheets. 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 Worksheets must be completed in class.

**Group PowerPoint Presentations:**

1 for each experiment: Four times over the course of the semester, you will be asked to design and 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 PowerPoint 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. The final presentation will have different expectations, which will be communicated prior to the presentation deadline.

**Presentation Peer Reviews:**

1 for each experiment: For each PowerPoint presentation, you will individually and anonymously provide constructive feedback on the presentations presented by other groups. Your evaluation feedback will be shared anonymously with the group.

**Peer Graph Evaluations:**

1 for experiment Four times over the course of the semester, you will be asked to individually reflect on graphs that your group constructed for your powerpoint presentation or a graph from the published literature or popular media. The purpose of this assignment is to make you aware of your own knowledge with graphs and to challenge you to think deeply about the appropriateness of your graph choice. By giving you the opportunity to reflect, we hope that you will expand your own graph knowledge and create better graphs for future assignments connected to this course and your future courses.

**Concerns about grades:**

There is no extra credit for Biological Sciences 1220 lab. We think the distribution of points possible to earn is fair, and in particular, 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 Biological Sciences 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.

### Lab Schedule Fall 2018 (subject to change)

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| --- | --- | --- |
| **Week** | **Lab activities and assignments due during lab** | **Assignment due before lab (Canvas)** |
| 1-Aug 20/21 | *No lab meeting during first week of classes* |  |
| 2-Aug 27/28 | Scientific Method/Fruit Fly Trap Experimental Design Worksheet/ Intro Statistical Analysis / Scent or Color Preference Pilots | Pre-lab |
| 3-Sep 3/4 | *Labor Day – no lab* |  |
| 4- Sep 10/11 | Revised Experimental Design Worksheet/Fruit Fly Scent or Color Preference Experiments; Trap Design Planning and Pilot Experiments | Pre-lab |
| 5- Sep 17/18 | Fruit Fly Trap Competition Full Experiments/ Statistical Analysis / Data Collection and Analysis /PPT draft | Pre-lab |
| 6- Sep 24/25 | Fruit Fly Trap PPT/ Graph Evaluation 1/ Introduction to Fiddler Crabs and Ethogram Development/ Video Recording Pilots | Pre-lab |
| 7- Oct 1/2 | Fiddler Crab Experimental Design Worksheet / Ethogram Development / Fiddler Crab Data Collection (Video Recordings) / PPT draft | Pre-lab |
| 8-Oct 8/9 | *Fall Break – no lab* |  |
| 9-Oct 15/16 | Fiddler Crabs PPT draft/ Fiddler Crab Data Collection and Analysis/ Midterm Course Evaluation | Pre-lab |
| 10- Oct 22/23 | Fiddler Crabs PPT/ Graph Evaluation 2 / Antimicrobial Properties of Food Experimental Design Worksheet / Antimicrobial Properties of Food Pilot Experiments | Pre-lab |
| 11- Oct 29/30 | Antimicrobial Properties of Food Full Experiments/Antimicrobial Properties of Food PPT draft | Pre-lab |
| 12-Nov 5/6 | Antimicrobial Properties of Food PPT/ Graph Evaluation 3 | Pre-lab |
| 13-Nov 12/13 | Forensics Lab DNA Extraction and PCR | Pre-lab |
| 14-Nov 19/20 | Forensics Lab Gel Electrophoresis/ Forensics PPT draft | Pre-lab |
| 15-Nov 26/27 | Forensics Lab PPT/ Graph Evaluation/ Course Wrap-Up | Pre-lab |
| 16-Dec 3/4 | *No lab meeting during final week of classes* |  |