The Biology of Sex and Death Course Syllabus

BIOL 1220 – Fall 2021

# 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 is gene expression and gene editing. We will also consider the adaptive role of cancer and infectious disease in causing death, and how climate change and land use decisions by humans cause extinction - the death of an entire species.

Students will be able to demonstrate the ability to obtain, analyze, interpret, and critique qualitative observations and quantitative measurements to explain natural phenomena and to test hypotheses. Lecture time will allow students to discuss, clarify, and apply new ideas through a variety of team-based activities. These will include 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 Methodology)
3. Work effectively on teams to present, explain, and critique your results and the results of others. (Teamwork & Scientific Methodology)
4. Interpret evidence and reflect upon how scientific thinking about biological topics can inform personal and societal decisions in the context of the environment, bioethics, medicine, and politics. (Authenticity & Reflection)

# Course Prerequisites

This course is a 4-credit hour lecture and lab course that has no prerequisites and fulfills a lab science elective. Students who decide to change majors into Biology after taking this course may take an advanced standing exam to substitute this course for BIOS 1107. This course is not a recommended substitute for BIOS 1107 or BIOS 1207 for Pre-Health students seeking to prepare for medical training and the MCAT. This course is not intended for declared Biology majors.

# Schedule

### Class meeting times

Lecture: Section A Tuesday & Thursday 9:30-10:45 am CULC 102

Lab: Section A1 Monday 12:30-3:15 pm CULC 487

Section A2 Monday 3:30-6:15 pm CULC 487

Section A3 Tuesday 12:30-3:15 pm CULC 487

### Weekly Schedule

Most weeks, we will have the following **due dates** in this course. Please add these to your planner and block off your prep and study time to meet these deadlines. The detailed schedule with due dates is at the end of the syllabus.

|  |  |
| --- | --- |
| **Day** | **Due** |
| Tuesday | Read materials & complete the IKE before classTest (laptop required) during the first 20 min of class  |
| Thursday | Read materials & complete the IKE before classBiology and Society Assignment during the last 20 minutes of class  |
| Sunday | HW due by 8:00 pm |

# Course Instructors

Dr. Brian Hammer, brian.hammer@biology.gatech.edu, 404-385-7701

Pronouns: he/him/his

Drop-in hours on Fridays 1-3pm and by appointment in CE223

*Dr. Hammer is a molecular microbiologist whose research focuses on mechanisms of cooperation and conflict used by disease-causing bacteria. For fun, Dr. Hammer enjoys indoor rock climbing.*

Dr. Linda Green, linda.green@gatech.edu, 404-894-1951

Pronouns: she/her

Drop-in hours on Thursdays1-3pm and by appointment in CULC 283D

*Dr. Green is an ecologist with particular interest in amphibians and conservation biology.*

Dr. Shana Kerr, shana.kerr@biosci.gatech.edu, 404-385-0065

Virtual drop-in hours on Mondays 11am-12pm; <https://bluejeans.com/382344651/9051> or make an appt by email.

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

Lydia Fletcher, lfletcher31@gatech.edu

Pronouns: she/her

Drop-in help on Mondays 3-4 pm in CULC 123

*Lydia is a third-year neuroscience major who loves biology. In her free time, she likes to run and explore different restaurants in Atlanta.*

# Course Materials

* Online Textbook at <https://bio1220.biosci.gatech.edu/>
* Learning Catalytics subscription at [www.learningcatalytics.com](http://www.learningcatalytics.com)
	+ If you already have an active fall semester 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.”)
* Laptop, required for in-class activities (Bring your own or [laptops can be checked out from the GT Library on 4 hour loan](https://www.library.gatech.edu/gadgets))
* Lab Coat (long sleeve, 100% cotton, available at Georgia Tech Bookstore)

# Mechanics & Expectations

We will spend class time to build your comprehension of the material you find the most difficult, based on pre-class assessments. Our activities will include answering questions, drawing diagrams, analyzing primary literature, and explaining phenomena in the context of biological principles. You will play a prominent role in determining the focus of each day’s effort with the pre-class assessment.

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. There will be weekly 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 in learning how to break down a complex problem into discrete and solvable parts. We expect you to demonstrate persistent learning by preparing for and attending every class, bringing notes that support quality participation in class, and taking personal responsibility for the success of yourself and your team.

# Communication

We will send course announcements through the Canvas portal, which can (and should!) be configured to send you a notification or email. We ask that you use proper salutations (“Dear Dr. Hammer”) and sign offs (meaning, your preferred name!) on your emails to us. Please don’t let us call you by the wrong name all semester; please keep reminding us until we get it right!

# Learning Accommodations

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

# Academic Honor Code and Plagiarism

All students are expected to abide by the Academic Honor Code, which can be viewed online at<https://osi.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.

# Evaluation

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

 Pre-class & In-class Activities: 10%

Homework Assignments: 10%

 Biology, Self, and Society: 10%

Tests: 30%

 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 assignments, in-class assignments, 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. Once purchased, wait for your instructor to send you a Session ID to join a learning catalytics session. 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 guide your preparation for class with baseline knowledge so you can 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 8pm. Homeworks close at 8pm 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.**

**Biology, Self, & Society (BS&S):** Biological science is everywhere and relevant in our daily lives. Connecting the process of science to your everyday experiences in the real world can be a challenge. Solidifying these connections helps us reflect on how biological science and scientific thinking can be helpful and contribute to decisions in our lives. This semester we will explore how biological science and society intersect. The Biology, Self, and Society portion of the course will occur largely in class as individual or team assignments in Canvas. Some assignments will have an outside-of-class element. **BS&S questions are scored ½ for completion and ½ for correctness.**

**Tests and Final Exam**: *Short, weekly* tests are held at the beginning of classand will be a mix of multiple choice, diagram/graph reading, and short answer questions. Test questions will be focused on recent material but as our content knowledge deepens, some degree of cumulative recall is expected. The lowest ***one*** test grade will be dropped. The final exam, held during finals week, will be a cumulative exam. Tests may be administered on paper or via the computer in Canvas. You will need to have a laptop when tests are administered via Canvas. Cell phones will not be allowed as a test-taking device. 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 brian.hammer@biology.gatech.edu and 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.

# Covid-related Concerns

These are unprecedented times. The best way for us to learn in this class is face-to-face, but if public health concerns require a shift to an online format then we will support your learning remotely. We may need to shift to remote learning depending on the health status of individuals in our classroom. Our expectation is that everyone who is eligible will be vaccinated; vaccination significantly reduces likelihood of severe symptoms, 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. 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 (<https://mytest.gatech.edu/>).

# Excused Absence Documentation

Typically, all excused absences are cleared through the Institute. Given the ongoing pandemic, we expect that you may need to join the class remotely due to Covid-19 exposure and/or quarantine. Please communicate with us promptly and we will share a BlueJeans link to participate in class. If you miss class because of illness (Covid-19 or other) or emergency, you should work with the Dean of Students office to provide documentation of your excused absence (studentlife.gatech.edu, 404-894-6367, select “request assistance” to communicate with the Dean’s office), which they will then communicate with us. Because their communication pipeline can be quite slow (weeks), we encourage you to let us know of your absence and anticipated return to school so we may make appropriate accommodations for missed assignments and test(s).

# 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 [tutoring.gatech.edu](https://tutoring.gatech.edu/) or at the Tutoring Center in Clough Commons 273. For assistance with revising lab reports or building and polishing a reflection or position piece, consult the CommLab (Clough Commons 447 or [commlab.gatech.edu](http://www.communicationcenter.gatech.edu/)).

Additional resources for academic and personal support are linked at [success.gatech.edu](https://www.success.gatech.edu/).

# Lecture Topics & Schedule (subject to change)

Here is the link to our textbook: <https://bio1220.biosci.gatech.edu/>

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| **Date** | **Day** | **Module** | **Content Topic**  | **Test/Assignment** | **HW due 8PM Sunday** |
| 24-Aug | T | 1.01 | Scientific Methodology & Credible Sources |  |  |
| 26-Aug | R | 1.02 | Life defined & biodiversity & Lab Introduction |  | HW 1 on Modules 1.01, 1.02 |
| 31-Aug | T | 1.03 | Life on Earth | **Test 1 covers Modules 1.01, 1.02 (HW 1)** |  |
| 2-Sep | R | 1.04 | Tree Thinking | Bio-Self-&-Society-01 | HW 2 on Modules 1.03, 1.04  |
| 7-Sep | T | 1.05 | Evolution by NS | **Test 2 covers Modules 1.03, 1.04 (HW 2)** |  |
| 9-Sep | R | 1.06 | Population growth & Species interactions | Bio-Self-&-Society-02 | HW 3 on Modules 1.05, 1.06  |
| 14-Sep | T | 1.07 | Life interacts |  |  |
| 16-Sep | R | – | *Synthesis (no new reading for today)* | Bio-Self-&-Society-03 | HW 4 on Module 1.07 |
| 21-Sep | T | 2.01 | Asexual Reproduction | **Test 3 covers Modules 1.05, 1.06, 1.07 (HW 3&4)** |  |
| 23-Sep | R | 2.02 | Sex (Meiosis) | Bio-Self-&-Society-04 | HW 5 on Modules 2.01, 2.02 |
| 28-Sep | T | 2.03 | Trait Inheritance | **Test 4 covers Modules 2.01, 2.02 (HW 5)** |  |
| 30-Sep | R | 2.04 | Human Reproductive Cycle | Bio-Self-&-Society-05 | HW 6 on Modules 2.03, 2.04 |
| 5-Oct | T | 2.05 | Plant Reproduction & the food supply | **Test 5 covers Modules 2.03, 2.04 (HW 6)** |  |
| 7-Oct | R | 2.06 | Sexual Dimorphism & Sexual Selection | Bio-Self-&-Society-06 | HW 7 Modules 2.05, 2.06 |
| 12-Oct | T | – | *Fall Break* |  |  |
| 14-Oct | R |  | *Synthesis (no new reading for today)* | Bio-Self-&-Society-07 | *No homework this week* |
| 19-Oct | T | 2.07 | Animal Mating Systems | **Test 6 covers Modules 2.05, 2.06 (HW 7)** |  |
| 21-Oct | R | 2.08 | Chromosomes, Genes, & DNA | Bio-Self-&-Society-08 | HW 8 on Modules 2.07, 2.08  |
| 26-Oct | T | 2.09 | Gene expression and development | **Test 7 covers Modules 2.07, 2.08 (HW 8)** |  |
| 28-Oct | R | 2.10 | IVF and Gene Editing  | Bio-Self-&-Society-09 | HW 9 on Modules 2.09, 2.10  |
| 2-Nov | T | 2.11 | Genetically Modified Organisms | **Test 8 covers Modules 2.09, 2.10 (HW 9)** |  |
| 4-Nov | R | 3.01 | Senescence | Bio-Self-&-Society-10 | HW 10 on Modules 2.11  |
| 9-Nov | T | 3.02 | Heritable Disease & Complex traits | **Test 9 covers Modules 2.11, 3.01 (HW 10)** |  |
| 11-Nov | R |  | *Synthesis (no new reading for today)* | Bio-Self-&-Society-11 | HW 11 on Modules 3.01, 3.02 |
| 16-Nov | T | 3.03 | Infectious Disease – Covid-19 |  |  |
| 18-Nov | R | 3.04 | Innate and Adaptive Immune Responses | Bio-Self-&-Society-12 | HW 12 on Modules 3.03, 3.04  |
| 23-Nov | T | 3.05 | Immunization and Allergies | **Test 10 covers Modules 3.02 - 04 (HW 11&12)** |  |
| 25-Nov | R | – | *Thanksgiving Break* |  |  |
| 30-Nov | T | 3.06 | Cancer Biology |  |  |
| 2-Dec | R | 3.07 | Extinction & Conservation | **Test 11 covers Modules 3.05, 3.06 (HW 13)** | HW 13 on Modules 3.05-3.07 |
| 7-Dec | T | 3.08 | *Synthesis (no new reading for today)* |  |  |
| 16-Dec | R | *–* | Final Exam (Thurs Dec 16, 8 am – 10:50 am) | **Final Exam covers all modules, including 3.06 and 3.07** |