BIOS 2611: Integrative Genetics Lab - Fall 2026 Syllabus

I want to start this syllabus by acknowledging that I recognize things may be stressful and that I realize this course is not the only one you are taking in your very busy semester! Additionally, there are many changes happening in the world beyond what happens in our classroom, so please reach out to me if you need any help, more flexibility with assignments, or just to chat. – Dr. Smith

Section: A01

Classroom & Class Time: Thursday 12:30-3:15 pm, Boggs 1-69

Co-requisites: BIOS 2611 and BIOS 2610 are co-requisites – you must enroll in both courses simultaneously. While this laboratory is the required companion to BIOS 2610, your grade in each course in independently earned.

Meet the instructor: Dr. Hannah Smith (she/her)
Email: hannah.smith@biosci.gatech.edu
Office Location: Boggs 1-90J
Drop-in Hours: TBD (or email for a Zoom appointment)

I'm excited to work with you all this semester. For many years, I studied antibiotic resistance and found different ways (mostly using genetics) to combat this growing global health issue. I have a major passion for teaching, and getting the privilege to teach you all brings me great joy. Outside of work, I love to travel, play with my cats, buy fun things that I probably don't need, and try new food around Atlanta. I can't wait to get to know you all better and I look forward to talking science with you!

Teaching Assistants. TBD

Course Description. Integrative Genetics Lab (BIOS 2611) is designed for students who have a keen interest in learning fundamental concepts and practical techniques in genetics. **This is a course-based undergraduate research experience (CURE)**, which is a class in which students design and conduct authentic research. This class addresses questions aimed at exploring various aspects of genetics such as transmission genetics, population genetics, and/or molecular genetics using a specified model system. **This fall, students in the course will address the research question: how do bacteria cope with spatial competition in a densely crowded community?** This course fosters an environment of scientific curiosity that will not only deepen students' understanding of genetics concepts but will build scientific communication skills to share knowledge with the community.

A Note on Scientific Research. We will use the research question above to create testable hypotheses, design & conduct experiments to test these hypotheses using molecular genetics tools, and analyze the data you collect to draw conclusions. The questions you will be asking this semester are not only new to you but are also new to us (the teaching and prep team). This is an exciting prospect, and we hope that the structure of this class will give you more ownership over your project, allow you to develop more self-efficacy, and help to cultivate your science identity. However, due to the nature of unanswered questions, we will likely encounter some of the frustrations and discomfort of scientific research: experiments that require troubleshooting, delays when experiments don't work perfectly right away, and results that may require us to modify how we think about the system. **This is the reality and the norm of scientific research!** Learning how to navigate the process of troubleshooting is the best way to prepare you for any future research experience, careers in research, medicine, or healthcare, and many other fields that require problem solving skills.

Course Learning Objectives.

By the end of this course, you will successfully be able to:

1. Generate a **testable genetics hypothesis**.
2. **Design & conduct experiments and analyze & interpret data**, incorporating relevant statistical methods when appropriate.
3. Utilize **appropriate bench techniques**, ensuring adherence to proper safety protocols.
4. Maintain an up-to-date, accurate, and **effective lab notebook**.
5. **Create and troubleshoot** scientific protocols.
6. Critically read and properly cite relevant **genetics primary literature**.
7. **Communicate findings** in written and oral formats.

Required Course Materials.

Notebook: You will maintain an electronic notebook that you (as a group) will upload to our Canvas website by the end of each class period.
Safety: Lab coat and safety glasses (see "Lab Safety" section below for details).
Website: We will be using Canvas as our course website, and all communication will be found there.
Other: Closed-toe shoes, long pants/skirts, and shirts covering the midriff are **required** for every lab (see "Lab Safety" section below for details). Calculators and laptops/tablets are highly useful.

Lab Safety. To keep you safe, Georgia Tech has a strict policy regarding appropriate clothing in laboratories where chemicals and organisms are used and manipulated. The guidelines are as follows:

1. **Long pants or skirts** must be worn in the laboratory.
2. **Closed-toe shoes** that cover the sides and the top of the feet must be worn in the laboratory.
3. **Lab coats** must be worn when working at the bench. Students are responsible for keeping their lab coats in good condition and reasonably clean so as not to create a hazard. Lab coats must cover the wearer to the knees.
4. **Safety glasses** must be worn when working at the bench. They must have side shields for splash protection and conform to the wearer's face. Glasses must be worn over prescription glasses and contact lenses.

No food or drinks are allowed in the labs. If you need to take a drink of water or eat something, please step out of the lab to do so. The laboratory safety policies are there to protect you and to ensure compliance with federal regulations while working with biological materials. More details will be discussed on the first day of lab and each student will be required to sign a safety agreement.

This semester, **we will be working with two different bacterial species**: *Pseudomonas fluorescens* and laboratory-adapted *Escherichia coli*. Please note that neither bacterium is known to cause health issues in healthy individuals, but below is a list of the strains we will use this semester if you have concerns:

Species	Strain
P. fluorescens	Pf0-1
E. coli	S17.1λpir
E. coli	HB101

Grading Scale and Breakdown.

A: 90% and above
B: 80%-89%
C: 70%-79%
D: 60%-69%
F: less than 60%

Participation	**5%**
Pre- & Post-lab Assessments	**15%**
Lab Notebooks	**15%**
Lab Report Write-up	**30%**
Oral Presentation	**15%**
Lab Report Drafts	**20%**

Participation. Our lab community is strengthened by active participation from all students, so we will assess your participation during class. To ensure equal participation from all students, **we will assign weekly group member roles.** The **manager** keeps the group on task and on time, the **recorder** takes notes on important thoughts expressed in the group and writes lab notebook entry for the day (see "Lab Notebooks" section for more detail on this), the **reporter** shares a summary of the group discussion with the larger class, and the **equity monitor** ensures that everyone's voice is heard and that everyone has an equal work load. Although you will need a laptop or tablet for this class, we ask that you only use it for course materials. **The use of cell phones during lab may result in zero participation points for that class**. If you must take a call, please let us know ahead of time if possible and step out of the lab to take it. Part of your participation grade will include **post-lab reflections** that you will complete on Canvas. **These will be available on Canvas the Friday after each lab and are due by 11:59pm the Wednesday before the subsequent lab period.** You may check in at any time with us to gauge your participation score to date.

Pre-lab & Post-lab Assessments. **Pre-lab assessments** are short assignments that focus on the upcoming lab material to ensure your understanding of the concepts so that you can be an active participant in lab. These will be available on Canvas the **Friday before** each lab and are **due at 11:59pm the Wednesday before each lab. Post-lab assessments** are short assignments that focus on the material we covered in lab that week to ensure your understanding of the concepts. These will be available on Canvas the **Friday after** each lab and are **due at 11:59pm the Wednesday before the subsequent lab period.** For both pre- and post-lab assessments, you will have **two submission attempts**, and your final score will be the average of the two. Late submissions will be worth 50% of your actual score (see next page for more information on resubmission attempts and late submissions). Note that if there is an assigned reading for the week, you should complete this before attempting the quiz. These are **individual** assignments.

Lab Notebooks. Your lab notebook this semester will be maintained electronically **as a group**. Although the recorder for the week is responsible for writing the lab notebook, **you will all contribute to the lab notebook**. If the recorder makes a mistake, everyone will be responsible for the error! For each experiment you perform, you should include: a title of the experiment, the purpose/rationale for performing the experiment, methods detailed enough that you could repeat it a year from now, results (if there are any for the day), your analysis of the results, and conclusions. Sometimes you will perform an experiment and analyze the results the next lab or after several lab periods. Your lab notebook entry should describe what you have done for the day and what you plan to do going forward. **Lab notebooks will be due after each class period by 11:59pm on that Thursday**. We suggest submitting the lab notebook before you leave the lab, but you have until the end of the day if needed. Keeping a real-time lab notebook is critical (even if you think you'll remember what you did the following day, you probably won't!), so having an on-time submission is 25% of your notebook grade. You will get regular feedback on your lab notebooks from the instructional team, and they will be graded on content, accuracy, and completeness according to the rubric.

Lab Report Write-up. Writing is an extremely important part of science, as it is the scientist way of storytelling. As such, you will get many opportunities throughout the semester to hone your scientific writing skills. You will have spent many long hours in the lab this semester working on this exciting project, and this final assignment is your opportunity to summarize all the information you have learned in one place. You will be tasked with writing a full lab report in the style of a scientific paper. We will work on this assignment in stages, and you will receive both peer and instructor feedback. Even though you performed the lab work collaboratively, **this is an individual assignment**, and all writing should be in your own words. **The exceptions are shared data, data tables, and figures**. Late submissions will be reduced by 10% for every day (24-hour period) that it is late.

Group Oral Presentation. Presentations and seminars are other common ways of communicating scientific research, especially at conferences where the scientists are often from many disciplines. At the end of the semester, you will give an oral presentation **in your lab groups**, and we will have a presentation session on the last day of class. Please note that this assignment cannot be resubmitted for additional credit, as it will be graded live.

Extra Credit. To encourage feedback on this course so that I can improve it in the future (including while you are still enrolled!), I offer 1% extra credit for providing evidence that you have submitted a midsemester evaluation, and 1% extra credit for visiting me in office hours at least once.

Other Course Policies and Expectations

Attendance. Since you are working with others to perform experiments and collect data, there is no way to "make up" a lab period. However, I understand that life can throw unexpected scenarios. If you must miss a class, please inform Dr. Smith and the TA(s) by email as soon as possible, preferably **before** the missed lab. 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, religious observances, and participation in official university activities. Medical documentation should be submitted to the Dean of Students (https://studentlife.gatech.edu/request-assistance) and **not** to the instructional team. Unexcused absences will result in a **2% reduction per absence** to your final course grade. **Persistent tardiness may result in loss of points from your participation grade.**

Late Policy. It is important to stay current with your work in this class because it is courteous to the instructors, it allows for peer feedback to occur in a timely manner, and it helps us gauge where you are in your project development. However, we want to support your learning of missed material. Therefore, **late work can be submitted up to 1 week beyond the due date for half credit.**

Assignment Resubmissions. We want you to succeed in this course, so we allow **resubmission attempts of assignments within one week of receiving your score.** This is to encourage you to create your best work and properly learn the content. Resubmission scores will be averaged with your initial score for the final score of the assignment.

Extensions. We understand there may be times when you are not able to complete your work on time. You are an adult and can manage your own priorities and schedule, so if you **request an extension from Dr. Smith at least 24 hours in advance of the due date**, they will almost always be approved.

Accommodations. For students who need academic accommodations, please discuss your needs with Dr. Smith to ensure we can best support your learning. Please do not hesitate to reach out at any point if your needs are not being met. You reach out to the Office of Disability Services or visit https://disabilityservices.gatech.edu/ for more information.

Academic Integrity. Academic dishonesty will not be tolerated. The obligations and expectations associated with the Georgia Tech Academic Honor Code and Student Code of Conduct is available online at: https://policylibrary.gatech.edu/student-life/academic-honor-code. While you will collaborate in performing the experiments and collecting data, each student is expected to write their own notebook entries and lab write-ups unless explicitly stated otherwise in the assignment instructions. Plagiarism includes reprinting the words of others without both the use of quotation marks and a citation. Direct quotes are rarely used in scientific writing, so you should rephrase the words of others and provide the proper citation(s). Please consult with us if you are unsure rather than running the risk of academic misconduct.

Student-Faculty Expectations Agreement. An atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and students is critical for Georgia Tech's thriving community. Please visit https://catalog.gatech.edu/rules/22/ for the basic expectations that you can have.

Non-Discrimination. I follow Georgia Tech's non-discrimination policy, which states that we prohibit "discrimination, including discriminatory harassment, on the basis of race, ethnicity, ancestry, color, religion, sex (including pregnancy), sexual orientation, gender identity, gender expression, national origin, age, disability, genetics, or veteran status". ***Behavior that disrupts our community may result in a deduction to your overall grade.*** To report any concerns around the topics of discrimination, harassment, bias, or anything else, please talk to me or visit https://eoc.gatech.edu/reporting-options/report-an-incident

to submit a complaint. Additionally, we invite you to please talk with us about things we can start to do, continue to do, or stop doing to make our classroom a place where everyone feels valued and safe to engage actively.

Campus Resources for Students. At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being and can be found here: https://students.gatech.edu/student-resource-guide.