BIOS 2301 Syllabus

General Ecology Laboratory, All Sections, 1 credit

Fall 2026

Instructor Information

Instructor: Emily Weigel

Email: Emily.Weigel@biosci.gatech.edu

General Course Information

Description

This skills-building course addresses **populations** (population growth), **communities** (how populations are tied together by interactions), and **ecosystems** (why does soil, air, and water quality matter; how do ecologists study landscapes; how do humans interact with the global ecosystem). We will practice the scientific method and its application to ecological principles and hone your skills in both data analysis and communication with scientific and lay audiences.

This course has been intentionally designed to align with the United Nations Sustainable Development Goals (UN SDGs), a set of 17 global goals that were adopted by all United Nations Member States as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The lessons have been deliberately connected to these goals to show the relevance of course content to solving real-world problems. Through this course and connections to Georgia Tech's Sustainability initiative (https://sustain.gatech.edu/), students will have opportunities to combine their academic and career interests to help people and nature sustainably thrive in Georgia, the United States, and around the globe.

Course Learning Outcomes

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

(1) Apply the process of science to identify and interpret basic ecological concepts through observation, experimentation, and modeled simulation
(2) Find, read, interpret, and cite appropriate scientific literature
(3) Design experiments and use basic statistics to analyze and interpret data

(4) Write lab reports and present work in the style accepted by Ecological scientific journals and societies
(5) Identify relationships among ecological, social, and economic systems*
(6) Demonstrate skills needed to work and communicate effectively in different types of communities*
(7) Evaluate how decisions impact the sustainability of communities*
(8) Describe how you can use Ecology to make communities more sustainable*
**Indicates specific goals of SLS/SCoRE achieved by students in this course*

Required Course Materials

1) A Fully-Charged Laptop to Access the Lab Manual and Write/Run Code: Lab materials will be made available on CANVAS prior to each lab. These materials are required to participate in lab each week, and some activities are only done digitally. We will be outside frequently, so it is particularly important that you budget your battery to ensure you will be able to complete the day's activities when we work off-site. Note: While there will be some weeks where you may want to print portions of the lab, please do so sparingly.

Also, laptops do not include chromebooks/tablets (they are particularly unsuited for coding assignments and general battery life). Rather, your laptop should meet institute standards (see here: https://sco.gatech.edu/). If something should happen to that device, temporary loaners are available 24/7 for free through the Library: https://libcal.library.gatech.edu/reserve/gadgets

Please note: While using Canvas on your phone or with plugins like BetterCampus can be convenient, and at times using your phone will be useful for class, we strongly suggest using Canvas without plugins on a computer when engaging regularly with the course. The web version without plugins is the best way to ensure you are viewing modules with all of the support materials (instructions, examples, rubrics, etc.) alongside the assignment submission box. Plugins have also been known to miscalculate or be missing due dates/file types; avoid them.

2) Lab Binder/Folder (Digital): Your labs, although covering different aspects of ecology, will build your skills as scientists over time. It is important that you keep these past labs and data for your own reference, particularly for your end-of-semester projects and weekly measurements.

3) Personal protective equipment (PPE): includes, as needed, masks, hair ties to pull your hair away from hazards, eye protection (provided, but good if you have your own personal equipment), appropriate outdoor clothing (good gripping, closed-toe shoes; shorts or breathable pants/sleeves and rain gear), etc. *Note safety measures will differ depending on the lab, but you should have regular access to these items.*

Grading Policy:

Your grade will be calculated out of **300** points using the following scale:

A = 90-100% B = 80-89.9% C = 70-79.9% D = 60-69.9% F = 0-59.9%

Points will be based on the following:

10 Pre-lab Assessments (5 pts each)	50
1 Plagiarism Exercise	10
5 Writing Subsections (15 pts each)	75
1 Full Lab Report	50
1 #SciComm Project	25
10 Term Project Measurements (3pts each)	30
Weekly Engagement (includes activities)	60

Description of Graded Components

- Pre-labs: Pre-lab assessments ('Pre-labs') will be given either as an assignment due by the lab's start or a quiz at the start of lab concentrating on the current day's material. The Pre-labs contain critical safety information and baseline knowledge necessary to successfully complete the day's lab. As such, the Pre-labs (assignments/pre-readings) can vary in length, depending on *your preparation and background, so please give yourself enough time to meaningfully complete them*. They are assigned specifically so that your experience in lab is safe and enjoyable, so please avoid the temptation to wait until the last minute/rush through this key info. Please also note: Should your prelab be unsubmitted, incomplete, or insufficient to complete the lab, the teaching team (Dr. Weigel and your TAs) may ask you to leave for the education and safety of yourself and others. *Be advised: You are responsible for ensuring the timely, correctly-formatted submission of quality work for the correct prelab as required, so please check your work!*

- Communicating Science: Writing Subsections, Reports, and #SciComm Project: In the **writing subsections**, you will write just one section of a lab report *for a given week's lab (i.e. what you did that week is the topic; see schedule below)*. These subsections are intended to facilitate your development as a scientific writer by providing smaller, focused, and more immediate practice and feedback on a given lab report section. Importantly, this approach reflects 1) real science writing, where drafts and writing a section at a time is common, and 2) the scientific literature, which suggests a minimum of four separate assignments may be needed before

students improve in their scientific writing (see Balgopal et. al 2018, Fallahi et. al 2006, and Libarkin and Ording 2012 and references therein for nice overviews of what's known).

The writing and data practice, as well as the feedback, from writing the subsections across the term serves to develop your skills sufficiently for your **full lab report**. Contrary to simply revising your past writing based on our more expert feedback, which merely shows you can correct mistakes pointed out to you, this final lab report serves as an opportunity to show what you have learned about how to write in science *yourself*. You will do this by authoring a single long-term study, *whose central question **you** get to define and answer* by leveraging the class data collected across the term. This report will have you craft again each of the subsections (whose formats are now familiar and practiced), but now collectively come together as part of a single, cohesive report written for scientists. You will further hone your scientific communication skills by creating a #SciComm project to communicate your science with the public—a decidedly different audience. More details will be given later in the term as we progress stepwise towards nice final products. Please note: we strongly suggest you *follow the guidance to begin working on your final deliverables as we go,* as it makes the best use of the practice opportunities, the highest quality work, and the smoothest end to the term for you.

- Term Project Measurements: Many ecological studies span time and space much larger than that of a standard, campus-bound university class. You will be responsible for the weekly observations of urban populations of squirrels (*Sciurus carolinensis*) across the semester. These are short observations that rely on accurate data records and entry. More details on the larger multi-year, US-wide dataset to which you're contributing, as well as how to do the measurements, will be given later in the first week.

- Plagiarism Assignment: We will cover what constitutes plagiarism, including how to collaborate, avoid self-plagiarism, and use external resources and tools, such as AI, at the start of the course. This is to familiarize you with academic standards of the discipline and the policies to which you will be held, alongside developing skills to help you maintain integrity in your efforts as you create work for this course.

- Weekly Engagement: As a general rule, this is on-time arrival to lab with all required materials and consistent, active engagement in the day's activities, including the accurate completion of in-class assignments. Additional elements, including safety

mandates, are specific to each lab and will posted in detail to Canvas. Late arrival and off-task behavior (including, but not limited to, side conversations, unrelated cell phone and laptop use, failure to wear safety equipment, and misuse of lab supplies) subtract from this score, up to the total points possible for that session.

Course Policies

Attendance and/or Participation

100% participation, that is, weekly engagement with lab materials and timely submission of lab work, is expected. **If you must miss a laboratory, you need to contact Dr. Weigel and your lab instructors as soon as possible. Do not wait until a deadline has passed to reach out, and please do not show up in person if ill.** To protect other members of the lab from possible illness, be in compliance with safety protocols, and prevent disruptions to other sections, we will not conduct make-up laboratories, but Dr. Weigel and your TAs will work with you directly on a case-by-case basis if you are unable to complete lab assignments on schedule. Please be proactive about contacting us; while we may reach out if we are concerned about where you are or how you're doing, please do not expect that we will 'chase you down' if work is missing.

Vacation, work commitments, and social events are not acceptable reasons to miss lab; however, legitimate reasons to miss a lab include suspected illness/close-contact with a person with flu/COVID-19 (or other readily communicable illness), serious illness, illness or death in your immediate family, and participation in official university activities. Whenever possible, please provide official institute documentation; if this is an impediment, please just reach out and we will try to work with you within the bounds of institute policies. *For your privacy, please do not send medical documentation, etc. directly to Dr. Weigel*, but rather use the confidential official institute processes which will confidentially notify your professors. Please work with Dr. Weigel if you need assistance with this process. Note that, should you need to miss 3 or more labs or other circumstances warrant, we may suggest you drop or take an Incomplete in the course; should that be advisable, we'll walk you through that as well. ***In sum, while we must work within policy, your safety and wellbeing matter more than a course.***

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/. As per GT policy, any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of

Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

We'd like to avoid situations that involve potential violations of the Honor Code, so we'd like to make clear: While students will collaborate in performing the experiments and collecting the data, **each student is expected to create their own figures and figure legends, compose their own code, and write their own lab reports and data analysis assignments**. Be advised that plagiarism includes reprinting the words of others without both the use of quotation marks *and* citation. As direct quotes are seldom used in scientific writing, *you are expected to personally rephrase the words to represent the ideas of others, without direct quotation, and provide the citation.* You are also expected to turn in your own original work produced for this class and avoid self-plagiarism. You will receive training and resources on how to avoid plagiarism, but if ever something is unclear or you are unsure, please ask your TA for help and/or clarification before turning in any assignment.

A note on Collaboration in the age of AI:

While the use of AI is not wholly forbidden (and, at times may be advised), **each student is expected credit any AI sources, by name and how they contributed to the final work**, as has become a professional standard for many scientific journals. For AI in particular, as technology capabilities change over time, the statement should **also include the date of access**, and in the event work is collaborative, include AI use by collaborators.
For lab reports (full and subsection) and the #SciComm Project, an explicit statement on AI is required to grade your assignment. *This statement is required whether or not any AI was used.* If this statement is omitted, your work will not be considered complete and gradable until the statement is added (i.e. it's late until the statement is in, and if it never appears, the assignment will be a 0).

Some examples:

- "For my lab report, my labmate George P. Burdell and I used ChatGPT to fix an error in our common code for an ANOVA (Jan. 6). I further edited the code to make it my own and create my own figures, and my lab report was written by me. I used Connected Papers to find research references to read and write a summary from (Jan. 8). I then used Grammarly to correct my grammar for the final report (Jan. 10)."
- "For my lab report, I am the sole author and did not use any form of AI to produce this work"

Please note that it is NEVER ok to upload materials from this class, whether provided by the teaching team or another student, *directly into an AI agent* (see the section on Intellectual Property above). It is also advisable to use tools provided by GT, as they tend to secure your work the best.

Core IMPACTS

Not applicable.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail Dr. Weigel using your GT email as soon as possible to discuss your learning needs. Be aware that accommodations must be discussed prior to implementation, particularly to ensure that an accommodation can work for your needs, can safely be implemented in the planned activities (e.g. if one requires food breaks), and fits pedagogically. The more proactive you are, the better we can collectively accomplish these goals.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Pre- &/or Co-Requisites

Undergraduate Semester level BIOL 1510/1511 or BIOS1107/1108 or equivalent with a Minimum Grade of D and (Prior-) Enrollment in BIOS 2300. ***Note that this lab may be taken alongside BIOS 2300 (Ecology Lecture), but these courses function independently.***

Extra Credit Opportunities

Periodically, extra credit opportunities may be offered. These are to supplement activities in the lab and improve undergraduate lab experience. Please pay attention to announcements for these opportunities. Please note that extra credit will be offered only to the entire class; it will not be offered on an individual basis. Any request or attempt to gain additional points not available to all students will be viewed as misconduct… and just uncool.

Submitting Assignments for Grading and Feedback

Assignment posting and submission

Assignments will generally be posted and collected via Canvas, except for select announced instances (e.g., we'll ask you to bring printed copies if fieldwork could be hazardous to

electronics). For all assignments, we encourage drafts and that you save copies (ideally in version-controlled ways external to your personal computer, e.g. in the cloud) to preserve and keep track of your work, particularly if your computer should become lost, stolen, or non-functional. ***Remember, you are responsible for ensuring you turn in the correct, complete file in the correct format by each deadline. Please get in the habit of checking your submission prior to deadlines to ensure it appears as intended***. Resubmissions before the deadline are allowable (and encouraged, as we all improve with revisions), but be aware: we won't 'pregrade' or grade multiple files- the last version you submit by the deadline will be the one we'll grade.

A note on Pregrading:
While you will have ample guiding materials, opportunities for practice, and regular feedback, we won't *pre-grade* your work (i.e. assess/grade work prior to grading your submission). This is for two big reasons:

1. *Your growth as a learner depends on cultivating the skill of self-assessment to discern quality, rather than merely reacting to our feedback.* Developing the ability to ask conceptual questions for clarification and honing editing skills yourself makes you a better writer (read: you will write faster and create higher-quality work more reliably when you develop self-assessment skills).
2. *We need to be able to meet your learning needs and do so equitably.* The teaching team collectively reviews submitted work and jointly decides to address any observed patterns. This keeps the TAs on the same page for evaluating the work and enables us to make adjustments if there are systemic issues. If we 'pre-grade', this muddies the water on what we can detect may need adjustment (meaning we can't positively adjust class grades or provide extra coaching/explanation if there are systemic issues). To pre-grade therefore gives an *unfair advantage to individuals while robbing the class holistically* of data-driven learning support.

We want all of you to have the opportunity to learn and succeed, so please understand that there's a line between clarification and pre-grading. Please understand that we may need to remind you of this boundary, and we would generally appreciate if you all will self-monitor for this.

Late assignments
Lab reports and writing subsections are the only assignments which will be accepted late, as we want to give you practice and feedback on written reports. Each assignment will be reduced one letter grade (10%) for each 24hr period it is late; note that this includes weekend days (i.e., assignments due Thursday and submitted Monday will lose 40%). All assignments, including lab reports and writing subsections, will be due ***at the start of lab*** (unless otherwise noted) and should be submitted electronically via Canvas assignment dropboxes **(*not email*)** to your TAs. *To ensure all assignments are accounted for and to track your progress, assignments submitted as linked documents (e.g. a link to a google doc) or email will not be accepted at any time, even if late.* We will still aim to evaluate and give you feedback on late work so that you may improve, however the grade will reflect the work's tardiness.

Revisiting graded work and Regrades thru Revise and Resubmit

For writing subsections only (not a full lab report or other assignment), you have one (1) opportunity to revise and resubmit one (1) writing subsection for reevaluation. You should use the feedback from your TAs and reflect on your own work to rewrite and improve your work. **You have one week from the return of the assignment to resubmit the subsection, and similar to professional manuscript submissions to a journal, you *must also include* a detailed cover letter** enumerating the changes you have made to improve your writing and/or rationale as to why you chose not to change an element. This letter can either be a separate file or within the same document as the first page; if you are unfamiliar with revise and resubmit letters, please see the posted template or consult google for multiple examples. The second grading, whether higher or lower, replaces the original score. No other regrades will be considered, so please choose wisely for what you submit. *As a tip, while every student is different, and you should pay attention to the personalized feedback your TAs, the sections which typically need the most work are introduction and discussion subsections.*

Extenuating circumstances and extensions

If you are unable to complete lab assignments on schedule, Dr. Weigel and your TAs will aim to help you get on track *if you reach out proactively*. *Note that, to consider any extension request for extenuating circumstance, the request must be submitted in writing via email AND include either 1) the current draft of the assignment or 2) an explicit statement that no work has been done to complete the assignment.*

Any extensions will be at the discretion of the instructional team, which will take into account the frequency of the requests and other grading constraints, as well as fairness to other students within and across sections. Note that the length of an extension will generally match the length of advance notice given in writing via email *before* the deadline, up to a max of 7 days, and the late policy *cannot* be used in addition to the extension request.

Grade Dispute Policies and Procedures

Grades are not negotiable, but mistakes can occur in the grading process. If it appears that an assignment has been incorrectly scored, notify us to request we take a second look.

Note: Any requests made via piazza, during open office hours, or during lab (i.e. public forums) will automatically be denied and void the opportunity for others; these requests can create misunderstandings and cause complex Honor Code issues, so please do NOT do this! Instead, please remember: **any requests for adjustment of grades must be submitted in writing via your GT email directly to your TA no more than 2 business days after the work has been returned.** After this point, grades will stand, regardless of the merits of a rereview at a later date; please see this as a measure to encourage your timely review of your own work when it is most relevant and helpful, and encouraging of taking responsibility for accurate assessment of your performance.

Your email should include the specific assignment, question number and a detailed explanation as to what you would like us to review, as well as a statement indicating how the scoring was applied. In all cases, the entire assignment will be reevaluated, and a final, revised grade (higher or lower) will be assigned if warranted. Note that such requests should be used in the event of mathematical errors or rubric criteria satisfied, and not to negotiate different criteria for grading (e.g. if an assignment or criterion has a specific point value, it is not appropriate to ask us to assign partial credit on fractional points or to create new criteria for which points will be awarded). We will strive to make grading criteria for every assignment clear well ahead of the submission deadline, so please do ask us clarifying questions prior to grading, rather than through this mechanism. It helps you learn, and it's a better use of your and our time!

Engagement, Acceptable Behavior, and Technology Usage Policy

You are expected to be engaged and respectful of others as requisite elements of being a student enrolled in this lab. Whether or not you are on campus, you represent Georgia Tech, and the guest speakers, field site access, and resources can be cut off due to misbehavior. Further, on days where we are outside/travel, you can and will be left behind if you are not present and ready to go when we need to leave and/or pose a risk to others during travel. While we encourage you to use laptops, smartphones, tablets, etc. in class to take advantage of online research tools during class time, we ask you to be mindful of your energy usage and attention, particularly when outside. This is for your- and your classmates'- learning AND safety.

Safety

Given the ecological dynamics of communicable diseases (flu, COVID-19, etc.) in densely populated areas and the general dangers that exist when doing field and laboratory work, we must always have an eye on safety. Specific safety measures will be announced relative to each week's work, and we ask that you always wear the appropriate PPE when conducting work for this course. You can be denied admission to spaces and field sites, get hurt, and may violate local laws/ordinances if you fail to comply. Furthermore, refusal to comply with proper PPE usage and other safety guidelines can result in grade reduction as well as potential disciplinary action for violating the Georgia Tech Honor Code. **Do science safely.**

Email Policy

Emails can be an appropriate forum to exchange ideas, particularly when addressing individual concerns (e.g., your grade, an institute absence, etc.). When you email, *please put BIOS2301 in the subject line so we see and prioritize the message*. Please also use your GT email; we can respond most thoroughly (and rapidly) when we can simply hit reply vs. needing to search for your verified GT email to respond. Please also do NOT use Canvas messaging to email; it is not reliable. We will generally reply well within 24 hrs and be most responsive M-F 8am-5pm, but if we reply outside of those hours, unless the concern is urgent (e.g., a field site has become

unsafe, we're troubleshooting your access to a lab, etc.), please don't feel the need to immediately respond. We understand we all need balance. Please pay us this same respect.

Class Content and Intellectual Property

All course materials, are protected by copyright law. Students may NOT reproduce, distribute or display (post/upload/ screenshot/take photos of) course materials in any other way without the instructor's prior written consent. Please note that this includes, but is not limited to, uploading course materials to "study websites" such as Chegg, Course Hero, AI agents, etc. Violations of this policy will be subject to GT's Student Code of Conduct, and applicable laws, even after the course has concluded.

Amendments

Your instructors reserve the right to make changes as severe weather and other factors necessitate. Any changes will be accompanied by advanced notice from the instructors.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being:

The Student Resource Guide provides a comprehensive and extensive list of student supports.

We suggest that you bookmark this reference and review it periodically to become familiar with the plethora of supports at Georgia Tech. You've got us, and your classmates, in this class, but the people supporting and vested in your overall physical, social, and mental well-being are far more numerous.

References

Balgopal, M.M., A.M.A. Casper, A.M. Wallace, P.J. Laybourn, and E. Brisch. 2018. Writing matters: Writing-to-learn activities increase undergraduate performance in cell biology. *BioScience* 68(6), 445-454.

Libarkin, J., and G. Ording. 2017. The utility of writing assignments in undergraduate bioscience. *CBE—Life Sciences Education 11*(1), 39-46.

Fallahi, C.R., R.M. Wooda, C. S. Austada, and H. Fallahi. 2006. A program for improving undergraduate psychology students' basic writing skills. *Teaching of Psychology* 33, 171-175.