

Essential Course Details:

Lecture meets MWF 11:00-11:50 am, Instructional Center 211; <https://bluejeans.com/667393047/6309> for students in quarantine or isolation

Recitation meets T 6:30-7:20 pm, Howey Physics L1; <https://bluejeans.com/507012299> for students in quarantine or isolation

Course Instructors:

<u>Instructor</u>	<u>Email</u>	<u>Drop-in hours</u>	<u>Link</u>
Dr. Shana Kerr	shana.kerr@biosci.gatech.edu	Thurs 9-10am-	https://bluejeans.com/122172577/8508
<u>Lab Course Instructor</u>	<u>Email</u>	<u>Drop-in hours</u>	
Dr. Colin Harrison	colin.harrison@biosci.gatech.edu	By appointment; see lab course syllabus for details	
<u>Teaching Assistants</u>	<u>Email</u>	<u>Drop-in hours</u>	<u>Link</u>
Noah Arnold	narnold6@gatech.edu	Tues 11am-12pm	https://bluejeans.com/296695176
Kelly Eick	keick3@gatech.edu	Thurs 2-3pm	https://bluejeans.com/600556281/1556
Taraji Long	tlong44@gatech.edu	Fri 9:30-10:30	https://bluejeans.com/335781411/1234
Kayla Weng	kweng7@gatech.edu	Wed 1-2pm	https://bluejeans.com/3324181616

When emailing your instructors, please include the course number (BIOS 1208) in the subject of your email.

Note: This Syllabus and Schedule are subject to change.

Covid-19 Information: This course meets in person and has in-person participation credit. While we expect each student to attend every class and be present for the entire class session, the reality is that we are in a pandemic. If you are sick, in isolation for covid, or in quarantine for possible covid exposure, we ask that you not come to class. Instead, email the TAs and Dr. Kerr immediately to communicate that you will not be in class and plan to participate remotely in a virtual session unless you are not well enough to do so. ***Students in quarantine are expected to participate fully via synchronous remote meeting.*** While far from ideal, this is the safest solution we can implement in the current circumstances.

In the event of a transition to hybrid or fully remote instruction, required in-person activities will be replaced with hybrid touchpoints or remote activities of equivalent point value. Should the course instructor fall sick, another instructor will take over the course. All communication about contingencies will happen via Canvas Announcements.

Covid-19 Mitigation: Our expectation is that everyone who is eligible will be vaccinated; vaccination significantly reduces likelihood of severe disease, including from the delta and omicron variants of SARS-CoV-2. Because the delta and omicron variants can be spread by vaccinated individuals, we also expect that everyone who is able to should wear a mask, correctly covering mouth and nose, when indoors and throughout the entire course meeting time. Both of these expectations are based on current CDC guidance. As that guidance is updated, we will communicate any new expectations.

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

We encourage all members of our class community to use the NOVID app to provide anonymous notification of any potential exposure to Covid-19. From the GT News Center: "Developed by researchers at Carnegie Mellon University, NOVID captures no personally identifiable information from people using it. Instead, smartphones running the app exchange synthetic codes with other smartphones that are nearby for more than a brief period of time. If the owner of one of the phones tests positive for the virus, they can notify other app users with whom they have been in contact without identifying themselves or sharing any personal information."

We encourage you to download the app (<https://covid-central.gatech.edu/app/novid>), ensure that it is active before you come to lab, and then notify the app if you test positive.

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Course Description & Learning Objectives: In this course, you will learn how the biology of you is similar – and different – to the biology of all life on Earth. We will explore the evolutionary history of all life on Earth through the lenses of development and reproduction, signaling and communication, and physiology and organ systems. As we explore the diversity of life on Earth, you'll be able to identify biological patterns and explain how you are both similar to and different to the breadth of diversity of life on Earth. You will also develop scientific skills in analyzing and interpreting scientific data to test hypothesis and communicate scientifically. Finally, you will develop and practice skills in metacognition to identify your best learning strategies that you will be able to employ in your future courses and career. By the end of this course, you will be able to:

- (a) Identify and explain patterns in organismal biology in the context of evolutionary history, growth and development, cell signaling and communication, and organ systems and physiology (Course lecture content)
- (b) Explain and interpret biological experiments, and analyze and interpret biological data (Research Connections assignments)
- (c) Communicate effectively using appropriate scientific language in class settings (Research Connections and Scientist Spotlights assignments)
- (d) Appreciate commonalities and differences among people who practice science, and recognize that there are multiple pathways into science as a career (Scientist Spotlight assignments)
- (e) Reflect on the usefulness of your study strategies and identify new strategies and practices to achieve your best learning strategies (Exam wrappers)

This course will foster your learning by using reflective practice, accentuate your critical thinking skills, and develop your confidence in soliciting guidance when problem-solving.

Online textbook and other required resources: This course is taught using the flipped classroom model, meaning that you will need to complete the assigned readings *before* each lecture. This course is taught without a traditional textbook, and all course readings and videos are on the course website, organismalbio.biology.gatech.edu. The day-by-day schedule below contains links to each required reading and videos. Required pre-class, in-class, and homework activities will be conducted through Learning Catalytics (learningcatalytics.com). Piazza (piazza.com), a free online forum, will be used for online discussions and Q&A outside of class.

Class time will consist of a variety of team-based activities designed to discuss, clarify, and apply new ideas by answering questions, drawing diagrams, analyzing primary literature, and explaining medical or ecological phenomena in the context of biological principles. We will spend class time on building your comprehension on the material you find the most difficult, based on pre-class assessments.

What are the roles of your instructor and TAs? 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 exploit class as an opportunity for you to make mistakes and be corrected in real-time.

What is your role as a student? Before class, read/watch/listen to the assigned preparatory material, complete each pre-class assessment (incoming knowledge evaluation, or IKE), and formulate any questions you want to ask. During class, you can expect to build your understanding through team activities (team in-class activities, or TICAs) and periodically contribute to class discussions and display your notes on the projection screen. Following class, there will be weekly homework assignments in Learning Catalytics to give you an additional opportunity to practice mastery of the material.

This course format will ask you to develop skills in identifying what information you need and learning how to break down a problem into achievable parts. Key attributes of A-level class participation include (based on rubric by Filipe and Pritchett 2013):

- Actively looking for and recognizing inadequacies of existing knowledge,
- Consistently seeking and asking probing questions,
- Using advanced and persistent search strategies,
- Evaluating solutions by assessing reliability and appropriateness of sources.

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. Team-based learning promotes the benefits of combining the effect of individually mastering a concept and reinforcing that understanding by sharing with and teaching peers. Learning Catalytics questions and large-group discussions during class will be used to identify problem areas and establish areas of content mastery.

Participation and Homework: To complete your pre-class incoming knowledge evaluation (IKEs), team in-class activities (TICAs), and your weekly homework assignments, students are required to have a Learning Catalytics account. Learning Catalytics can be purchased directly at https://learningcatalytics.com/users/sign_up or from the Georgia Tech Bookstore in Tech Square. Points earned in Learning Catalytics will contribute to the "participation" portion of your course grade. To participate in class, you will need to have an internet-ready smartphone, tablet, or laptop in class. Phone and computer use should be restricted to class-related material, and off-task use may result in loss of participation points for that day.

Incoming Knowledge Evaluations (IKEs): 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 that day's Incoming Knowledge Evaluation (IKE). IKE sessions generally close an hour before the start of class and will not be reopened for credit, but you can review closed sessions for study purposes. We'll use your responses to guide what we do in class. IKE questions are often not at the same level as you can expect to see on an exam; instead, they ensure that you come to class with effective baseline knowledge to work up to exam-level questions in class.

Lectures and Team In-class Activities (TICAs): Attendance and participation in lecture correlate strongly with performance in this course. We will make our lecture materials available and urge you to download and print them for use in active note-taking during class. Much of the material and application of ideas needed for success in this course will be presented only in lecture and assessed via Learning Catalytics. Questions presented in class are usually at the same level as exam questions. TICA 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.

Homeworks: Homework assignments will be made available each weekend in Learning Catalytics and are due by the start of class each Monday. Homeworks will not be reopened for credit, but you can review closed sessions for study purposes.

Research Connections: For each course module, you will read and summarize the key findings of a primary research paper from a selection of papers provided to you. You will also describe one experiment from the paper, and then explain how the results of that experiment support the paper's key findings. Finally, you will explain in-depth how the paper illustrates and/or expands upon multiple Learning Objectives of your choosing from different course readings associated with module in question. The number of Learning Objective links will increase for each Research Connection as we proceed in the semester. These written assignments will be posted on Canvas and will be due by 11:59 PM on the posted deadline. These assignments will be subject to plagiarism review by Turnitin. Research Connections will be accepted late with a 10% late penalty per day.

Scientist Spotlights Four each course module, you will read and compose a written response to information about the life and work of a compelling scientist whose work is related to some aspect of the course content. These written assignments will be posted on Canvas and will be due by 11:59 PM on the posted deadline. These assignments will be subject to plagiarism review by Turnitin. Scientist Spotlights will be accepted late with a 10% late penalty per day.

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Late Assignments (Scientist Spotlights and Research Connections only): Late Research Connections and Scientist Spotlights will be accepted with a 10% late penalty per day. IKEs, TICAs, and HWs are not accepted late without documentation warranting an excused absence.

Missed Participation: IKEs and Homeworks are completed asynchronously and thus makeup IKEs and HWs are not typically administered without documentation to explain an extended period where you were unable to participate in course expectations (e.g. documented illness). TICAs are administered synchronously during class time, and you are expected to participate in person during regularly scheduled class. However, because we recognize that occasionally you may experience issues that prevent you from attending and participating on a given day, you may complete makeup TICAs upon request with sufficient documentation and rationale. All requests should be sent via email to both the lecture instructor and the lecture TAs.

Exams and Quizzes: This course has four midterm exams and a cumulative final exam. Exams will be held synchronously during class time, are open-note and open-textbook, but are NOT collaborative (not open-peer) and not open to any other community-sourced assistance (eg, not open to Chegg or similar), and will consist of multiple-choice questions based on the Learning Objectives. Exams will be timed to approximately 1 minute per question. The best way to study for exams is to practice the Learning Objectives.

Missed Exams: If you miss an exam for any reason, you will receive a grade of 0 (zero) on that exam unless you petition us for a makeup exam within 24 h of the start of the missed exam, and we approve your petition. Your petition must be submitted in writing (by e-mail) with a legitimate reason for missing the exam. **Documentation is required for any exam to be considered excused; any medical documentation should be submitted to the Dean of Students (https://gatech-advocate.symphlicity.com/care_report/index.php/pid201106) and not to your course instructors.** You are encouraged to submit your petition before the exam if you know of your scheduling conflict in advance. We will consider each petition individually. Examples of legitimate reasons to miss an exam include illness, illness or death in your immediate family, and participation in official university activities. If we approve your petition, we will either administer a makeup exam or remove the missed exam from your grade calculation by using the weighted average of your other exam scores as your grade for the missed exam, making it completely neutral in your final point total.

Recitation will be led by the TAs every Tuesday, 6:30-7:20. Recitation is an opportunity for you to discuss class material in further detail. Recitation attendance is strongly encouraged and is correlated with exam performance and should be a regular component of your study habits should you desire an A in this course.

Tutoring: 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).

Honor Code: All students are expected to abide by the Academic Honor Code, which can be viewed online at www.honor.gatech.edu. Plagiarism is the unattributed use of the words or ideas of others; plagiarism on any assignment, including laboratory reports and the group project, will be referred to the Office of Student Integrity for adjudication. If you have any questions regarding your assignments and plagiarism, we encourage you to consult with any of us before you submit the assignment. Cell phones must be turned off during exams, and any student found with a cell phone that is not off during an exam may be referred to the Honor Council.

Learning Accommodations: If needed, we will make classroom accommodations for students with disabilities. These accommodations should be arranged in advance and in accordance with the Office of Disability Services (<http://www.disabilityservices.gatech.edu>).

Statement of Intent for Inclusivity: As members of the Georgia Tech community, we are committed to creating a learning environment in which all students feel safe and included. Because we are individuals with varying needs, we are reliant on your feedback to achieve this goal. To that end, we invite you to enter into dialogue with us about the things we can stop, start, and continue doing to make our classroom an environment in which every student feels valued and can engage actively in our learning community.

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 commmlab.gatech.edu).

Additional resources for academic support include:

- Center for Academic Success: <http://success.gatech.edu>
 - 1-to-1 tutoring: <http://success.gatech.edu/1-1-tutoring>
 - Peer-Led Undergraduate Study (PLUS): <http://success.gatech.edu/tutoring/plus>
 - Academic coaching: <http://success.gatech.edu/coaching>
- Residence Life's Learning Assistance Program
<https://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 Office of the Dean of Students: <http://studentlife.gatech.edu/content/services>; **404-894-6367**; Smithgall Student Services Building 2nd floor
 - You also may request assistance at https://gatech-advocate.symplcity.com/care_report/index.php/pid3833662?
- Counseling Center: <http://counseling.gatech.edu>; **404-894-2575**; Smithgall Student Services Building 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): <http://studentlife.gatech.edu/content/need-help>
 - Can assist with interview clothing, food, and housing needs.
- Stamps Health Services: <https://health.gatech.edu>; **404-894-1420**
 - Primary care, pharmacy, women's health, psychiatry, immunization and allergy, health promotion, and nutrition
- OMED: Educational Services: <http://www.omed.gatech.edu>
- Women's Resource Center: <http://www.womenscenter.gatech.edu>; 404-385-0230
- LGBTQIA Resource Center: <http://lgbtqia.gatech.edu/>; 404-385-2679
- Veteran's Resource Center: <http://veterans.gatech.edu/>; 404-385-2067
- Georgia Tech Police: 404-894-2500

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

Midterm exams (8.75% each)	35%
Final exam (cumulative):	20%
Writing in Science/Scientist Spotlights (equally weighted, 3% each)	15%
Research Connections* (approximately 5% each; see below)	20%
Participation** (each assignment equally weighted among HWs, IKEs, and TICAs***) 15%	
*RC1 = 3%; RC2 = 4%; RC3 = 6%; RC4 = 7% for a total of 20%	
**HWs, IKEs, and TICAs are graded for participation and completion, not accuracy	
***Each IKE, TICA, and HW is worth 1 point; the total score you earn is divided by the total number of assignments offered, and your total participation score contributes 20% of your final course grade	

Note that these components add up to 105%, meaning that there is 5% extra credit built into the course components. Final letter grades will be assigned using the following scale:

A: $\geq 90.0\%$

B: $\geq 80.0\%$ and $< 90.0\%$

C: $\geq 70.0\%$ and $< 80.0\%$

D: $\geq 60.0\%$ and $< 70.0\%$

F: $< 60.0\%$

Date	Lecture Topics	Required Reading & Videos
10 Jan	Course Overview	
=> M1	Start Module 1: Biodiversity	
12 Jan	Phylogenetic Trees and Geologic Time Recognizing relationships between life on Earth	<u>Phylogenetic Trees and Geologic Time</u>
14 Jan	Prokaryotes: Bacteria and Archaea Earliest signs of life Prokaryotes as ancient architects Roles in medicine & bioremediation	<u>Prokaryotes: Bacteria and Archaea</u>
17 Jan	<i>MLK Holiday</i>	
19 Jan	Eukaryotes and their Origins Diversity in life cycles, morphology, and metabolism How to Write in Science/Avoiding Plagiarism due by 11:59pm	<u>Eukaryotes and their Origins</u>
21 Jan	Land Plants Seedless and seed plants Origins and ecological importance	<u>Land Plants</u>
24 Jan	Fungi Ecosystem services	<u>Fungi</u>
26 Jan	Animals: Invertebrates Annelids, cephalopods, and insects	<u>Animals: Invertebrates</u>
28 Jan	Animals: Vertebrates Fish, reptiles, birds, and mammals Scientist Spotlight 1 due by 11:59pm	<u>Animals: Vertebrates</u>
31 Jan	The Tree of Life over Geologic Time Research Connection 1 due by 11:59pm	<u>The Tree of Life over Geologic Time</u>
2 Feb	Mass Extinctions & Climate Variability Causes and evidence for mass extinctions Climate variability	<u>Mass Extinctions and Climate Variability</u>
4 Feb	Module 1 Exam	
=> M2	Start Module 2: Growth and Reproduction	
7 Feb	Multicellularity, Development, and Reproduction Differentiation and growth	<u>Multicellularity, Development, and Reproduction</u>
9 Feb	Animal Reproduction I Mating systems and reproductive strategies	<u>Animal reproductive strategies</u>
11 Feb	Animal Reproduction II Reproductive structures and functions	<u>Animal reproductive structures and functions</u>
14 Feb	Animal Development I Fertilization, polarity, cleavage	<u>Animal development I: fertilization and cleavage</u>
16 Feb	Animal Development II Gastrulation, differentiation, amniotic membranes	<u>Animal development II: gastrulation and organogenesis</u>
18 Feb	Plant Reproduction Double fertilization, seeds, fruit Alternation of generations Scientist Spotlight 2 due by 11:59pm	<u>Plant reproduction</u>

21 Feb	Plant Development I Tissue development, differentiation, and function Research Connection 2 due by 11:59pm	<u>Plant development I: Tissue differentiation and structure</u>
23 Feb	Plant Development II Role of meristems Primary and secondary growth	<u>Plant development II: Primary and secondary growth</u>
25 Feb	Module 2 Exam	
=> M3	Start Module 3: Chemical and Electrical Signals	
28 Feb	Principles of chemical signaling, and communication by microbes Quorum sensing, biofilm formation in microbes	<u>Principles of chemical signaling, and communication by microbes</u>
2 Mar	Animal Hormones Hormone effects, production, distribution Case study systems	<u>Animal hormones</u>
4 Mar	Plant Hormones and Sensory Systems Growth, dormancy, germination Responses to injury, chemical defenses	<u>Plant hormones and sensory systems</u>
7 Mar	Neurons Ion channels, action potentials, synapses, neurotransmitters	<u>Neurons</u>
9 Mar	Nervous Systems Integration, learning & memory	<u>Nervous systems</u>
11 Mar	Animal Sensory Systems Sensory cells & organs, specificity Scientist Spotlight 3 due by 11:59pm	<u>Animal sensory systems</u>
14 Mar	Motor proteins and muscles Cilia, flagella, muscles Research Connection 3 due by 11:59pm	<u>Motor proteins and muscles</u>
16 Mar	Motor units and skeletal systems Control of contraction strength Types of skeletal systems	<u>Motor units and skeletal systems</u>
18 Mar	Module 3 Exam	
21-25 Mar	<i>Spring Break</i>	
=> M4	Start Module 4: Nutrition, Transport, and Homeostasis	
28 Mar	Nutritional Needs & Adaptations Autotrophy, heterotrophy, mixotrophy	<u>Nutrition: what plants and animals need to survive</u>
30 Mar	Acquisition of Nutrients in Plants Soil processes, N ₂ -fixation	<u>Nutrient acquisition by plants</u>
1 Apr	Plant Transport Processes I Uptake of water and minerals Xylem and evapotranspiration	<u>Water transport in plants: xylem</u>
4 Apr	Plant Transport Processes II Phloem, sieve tubes, and translocation	<u>Sugar transport in plants: phloem</u>

6 Apr	Acquisition of Nutrients in Animals Structure and function of digestive organs Microbial roles in nutrition	<u>Nutrient acquisition by animals</u>
8 Apr	Animal Gas Exchange and Transport Principles of diffusion Lungs and gills Mechanisms for transporting O ₂ and CO ₂	<u>Animal gas exchange and transport</u>
11 Apr	Animal Circulatory Systems Evolution of circulatory systems, heart structure, blood vessel structure and function	<u>Animal circulatory systems</u>
13 Apr	Mammalian Cardiac Cycle Human cardiac cycle, hormonal regulation	<u>Mammalian cardiac cycle</u>
15 Apr	Animal Ion and Water Regulation Excretory mechanisms and systems Adaptations in different environments Scientist Spotlight 4 due by 11:59pm	<u>Animal ion and water regulation</u>
18 Apr	Mammalian Kidney Mammalian kidney function and hormonal regulation Research Connection 4 due by 11:59pm	<u>Mammalian kidney</u>
20 Apr	Plant and Animal Environmental Responses Photosynthetic strategies & water conservation Thermoregulation	<u>Plant and animal responses to the environment</u>
22 Apr	Module 4 Exam	
25 Apr	Class synthesis	
29 Apr	Final Exam - Cumulative 11:20am-2:10pm	<i>Note the final exam will be scheduled to end earlier than the officially scheduled time. The total time available on the exam will be based on the number of questions included on the final, with approximately 1 minute per question. The final exam guidelines can be found here: https://registrar.gatech.edu/info/exam-guidelines</i>