

Essential Course Details:

Lecture meets MWF 11:00-11:50 am, Instructional Center 211 or [Zoom](#) for students in quarantine/isolation*

Recitation meets T 6:30-7:20 pm, Howey Physics L1

**advanced approval by email is required to attend via Zoom as a temporary accommodation only*

<u>Lecture Instructor</u>	<u>Email</u>	<u>Drop-in hours and location</u>
Dr. Shana Kerr	shana.kerr@biosci.gatech.edu	Wednesdays 1-2pm, Boggs 1-76B; or email for alternative
<u>Lecture TAs</u>	<u>Email</u>	<u>Drop-in hours and location</u>
Tess Korte	tkorte6@gatech.edu	Tuesdays 10-11am; Zoom
Kiari Mays	kmays35@gatech.edu	Tuesdays 4-5pm; Zoom
Anna-Raquel Perez	aperez315@gatech.edu	Thursdays 4-5pm; Zoom , or in person with advanced notice
Neha Sonthi	nsonthi3@gatech.edu	Wednesdays 9:30-10:30am; Zoom
<u>Lab Instructor</u>	<u>Email</u>	<u>Drop-in hours and location</u>
Dr. Colin Harrison	colin.harrison@biosci.gatech.edu	See lab course syllabus for details

Note: This Syllabus and Schedule are subject to change.

Communication Expectations: When emailing your instructors, include the course number (BIOS 1208) in the subject of your email. We require prompt and proactive communication by email in order to address any course issue you might experience, including but not limited to: absences, missed or late assignments, disruptions to Learning Catalytics access, feedback on writing assignments, etc.

We will utilize Canvas Announcements for all course communications. **Confirm that you are receiving Canvas Announcements to your email: In Canvas, Go to Account > Notifications and turn on email “Notify immediately” for Announcements**

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, we also want to prevent infectious disease spread. 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 ALL members of the instructional team (instructors and TAs) to communicate that you will not be in class and request to participate remotely in a virtual session unless you are not well enough to do so. Virtual sessions are intended only as a short-term solution for students who are ill or are otherwise unable to attend in person, and approval via email is required to attend virtually.

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, Learning Catalytics*)
- b) Explain and interpret biological experiments, and analyze and interpret biological data (*Research Connections*)
- c) Communicate effectively using appropriate scientific language (*Research Connections, Scientist Spotlights*)
- d) Appreciate commonalities and differences among people who practice science, and recognize that there are multiple pathways into science as a career (*Scientist Spotlights*)
- e) Reflect on the usefulness of your study strategies and identify new strategies and practices to achieve your best learning strategies (*Exam wrappers*)

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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). 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. 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 help you 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 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.

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.

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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.

Writing in Science/Scientist Spotlights: For these assignments, 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 late penalty as specified in the *Late/Missed Assignments* information below.

Figure Analysis/Research Connections: For these assignments, 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 the current or previous modules. 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 late penalty as specified in the *Late/Missed Assignments* information below.

Absences: Regular attendance and active participation during class time are correlated with better performance in the course. If you experience any situation that causes you to miss more than one consecutive class or otherwise interferes with your ability to keep up with course assignments, we ask that you request assistance from the Dean of Students using this link: <https://studentlife.gatech.edu/request-assistance>. Select "Class Absence Verification" for documentation of an absence, including missed exams. Select "Meeting with a Dean" for any other issue that is interfering with your ability to succeed in this or any other course.

Late/Missed Assignments: Keeping up with writing and other assignments is a critical part of staying on track in this course; however, we recognize that sometimes things happen in life that are outside of your control. With this in mind, we offer the following options to every student. Instructions for how to use these opportunities are indicated at the bottom of each bullet point below.

- **Writing assignments (Scientists Spotlights, Research Connections):** Every student has the option to turn in two writing assignments late within 3 days with no late penalty and without documentation required. Further extensions (beyond 3 days) or requests for additional late work will require documentation warranting an extension. Please note, in order to protect your privacy, documentation of personal or family illness should NOT be shared with the instructor but should instead be sent to the [Dean of Students](#). Any additional writing assignment(s) turned in late without documentation will be subject to a 10% late penalty per day. *To utilize one of the two allowed 3-day extensions on writing assignments, use the "comment" option in the assignment submission in Canvas to notify the instructor and TAs of the request at the time of late assignment submission.*
- **Participation (IKEs, TICAs, and HWs):** HWs, IKEs, and TICAs are graded for participation and completion, not accuracy. The following two policies are in place to regarding missed participation:
 - Every student has the option for two makeup participation sessions (IKE, TICA, or HW) within 3 days and without documentation required. Further extensions (beyond 3 days) or requests for additional makeup sessions will require documentation warranting an excused absence (e.g., documented illness). Please note, in order to protect your privacy, documentation of personal or family illness should NOT be shared with the instructor but should instead be sent to the [Dean of Students](#). *To utilize one of the two allowed make-up LC sessions, send an email request to the lecture instructor and cc the TA team.*
 - For all students, we will drop your 3 lowest LC scores to account for days when you cannot arrive on time, think with optimum clarity, or just need a break. There is no need to email us to take advantage of this option; *we will perform this adjustment for all students at the end of the term.*

Re-grade policy: Requests for re-grading must be made in writing (email), explain the rationale for the re-grade request, and be made within one week of the assignment's return. If you request a re-grade and the re-graded assignment's score is lower than the previous score you must accept the updated lower score.

Exams and Quizzes: This course has four midterm exams and a cumulative final exam. Exams will be held in-person during class time, will be administered via Canvas with LockDown Browser, and will consist of multiple-choice questions based on the Learning Objectives. Exams are individual assignments and are closed note, closed book, closed-internet. 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://studentlife.gatech.edu/request-assistance>) 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 replace your missed exam score with the average of your other exam scores, weighted by the class average for each exam. The formula to calculate your score on a missed exam is: $(\text{your missed exam score}) = (\text{class average of missed exam}) \times [(\text{sum of your scores on exams you took}) / (\text{sum of class averages on exams you took})]$

Recitation will be led by your 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.

Use of AI: Machine learning language processing and artificial intelligence are becoming common in the generation of text. These tools are sophisticated enough that they can now generate answers to some basic questions (which does not mean they are necessarily correct answers). The use of AI/ML-generated text is not allowed to generate your response to any assignment in this class. However, these AI tools can be useful in the process of editing and refining a written response. AI tools should be used as you would a trip to the writing center, where the AI or writing tutor can help provide outlines, feedback, and editing to a written response. If you utilize AI in your response, you should submit the input you provided the AI, cite the AI you used, and explain how it was utilized.

Learning Accommodations: We will make classroom accommodations for students with documented accommodations per the Office of Disability Services. 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.

Copyright: With the exception of third-party material, course materials provided in by the instructors are licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. Sharing course materials on commercial websites is in violation of this license.

Academic Support: Georgia Tech offers a variety of free learning, communications, and other academic support options:

- Tutoring & Academic Support: <https://tutoring.gatech.edu/>
 - 1-to-1 tutoring: <https://tutoring.gatech.edu/tutoring/>
 - Drop-in tutoring: <https://tutoring.gatech.edu/drop-in/>
 - PLUS sessions: <https://tutoring.gatech.edu/plus-sessions/>
- 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 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://studentlife.gatech.edu/request-assistance>
- Counseling Center: <https://mentalhealth.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

USG IMPACTS statement: The statement below is required by the University System of Georgia

BIOS 1208 Organismal Biology for Majors

This is a Core IMPACTS course that is part of the STEM area.

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help students master course content, and support students' broad academic and career goals.

This course should direct students toward a broad Orienting Question:

- How do I ask scientific questions or use data, mathematics, or technology to understand the universe?

Completion of this course should enable students to meet the following Learning Outcome:

- Students will use the scientific method and laboratory procedures or mathematical and computational methods to analyze data, solve problems, and explain natural phenomena.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:

- Inquiry and Analysis
- Problem-Solving
- Teamwork

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

Midterm exams (approximately 10% each, see #1 below)	40%
Final exam (cumulative):	20%
Writing in Science; Figure Analysis, Scientist Spotlights (3% each)	18%
Research Connections (approximately 5% each; see #2 below)	15%
Participation* (equally weighted; see # 3 below)	12%

*LC sessions are graded for participation, not accuracy.

Note that these components add up to 105%, and scores will be calculated out of 100% (not normalized over 105%), meaning that there is 5% extra credit built into the course components. We will use the following procedure for calculating your final grades:

1. We will weight your 4 midterms 6%, 10%, 10%, and 14%, where your lowest midterm score will count 6% and your highest midterm score will count 14% of your final grades
2. We will weight RC1 as 3%, RC2 as 5%, and RC3 as 7% of your final grade.
3. Each IKE, TICA, and HW is worth 1 point; the total score you earn is divided by the total number of assignments offered (dropping the lowest 3 scores)
4. We will assign final letter grades 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
8 Jan	Course Overview	
=> M1	Start Module 1: Biodiversity	
10 Jan	Phylogenetic Trees and Geologic Time Recognizing relationships between life on Earth	Phylogenetic Trees and Geologic Time
12 Jan	Prokaryotes: Bacteria and Archaea Earliest signs of life Prokaryotes as ancient architects Roles in medicine & bioremediation How to Write in Science/Avoiding Plagiarism due by 11:59pm	Prokaryotes: Bacteria and Archaea
15 Jan	<i>MLK Holiday</i>	
17 Jan	Eukaryotes and their Origins Diversity in life cycles, morphology, and metabolism	Eukaryotes and their Origins
19 Jan	Land Plants Seedless and seed plants Origins and ecological importance Figure Analysis due by 11:59pm	Land Plants
22 Jan	Fungi Ecosystem services	Fungi
24 Jan	Animals: Invertebrates Annelids, cephalopods, and insects	Animals: Invertebrates
26 Jan	Animals: Vertebrates Fish, reptiles, birds, and mammals Scientist Spotlight 1 due by 11:59pm	Animals: Vertebrates
29 Jan	The Tree of Life over Geologic Time	The Tree of Life over Geologic Time
31 Jan	Mass Extinctions & Climate Variability Causes and evidence for mass extinctions Climate variability	Mass Extinctions and Climate Variability
2 Feb	Module 1 Exam	
=> M2	Start Module 2: Growth and Reproduction	
5 Feb	Multicellularity, Development, and Reproduction Differentiation and growth	Multicellularity, Development, and Reproduction
7 Feb	Animal Reproduction I Mating systems and reproductive strategies	Animal reproductive strategies
9 Feb	Animal Reproduction II Reproductive structures and functions Research Connection 1 due by 11:59pm	Animal reproductive structures and functions
12 Feb	Animal Development I Fertilization, polarity, cleavage	Animal development I: fertilization and cleavage
14 Feb	Animal Development II Gastrulation, differentiation, amniotic membranes	Animal development II: gastrulation and organogenesis
16 Feb	Plant Reproduction Double fertilization, seeds, fruit Alternation of generations Scientist Spotlight 2 due by 11:59pm	Plant reproduction

19 Feb	Plant Development I Tissue development, differentiation, and function	<u>Plant development I: Tissue differentiation and structure</u>
21 Feb	Plant Development II Role of meristems Primary and secondary growth	<u>Plant development II: Primary and secondary growth</u>
23 Feb	Module 2 Exam	
=> M3	Start Module 3: Chemical and Electrical Signals	
26 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>
28 Feb	Animal Hormones Hormone effects, production, distribution Case study systems	<u>Animal hormones</u>
1 Mar	Plant Hormones and Sensory Systems Growth, dormancy, germination Responses to injury, chemical defenses Research Connection 2 due by 11:59pm	<u>Plant hormones and sensory systems</u>
4 Mar	Neurons Ion channels, action potentials, synapses, neurotransmitters	<u>Neurons</u>
6 Mar	Nervous Systems Integration, learning & memory	<u>Nervous systems</u>
8 Mar	Animal Sensory Systems Sensory cells & organs, specificity Scientist Spotlight 3 due by 11:59pm	<u>Animal sensory systems</u>
11 Mar	Motor proteins and muscles Cilia, flagella, muscles	<u>Motor proteins and muscles</u>
13 Mar	Motor units and skeletal systems Control of contraction strength Types of skeletal systems	<u>Motor units and skeletal systems</u>
15 Mar	Module 3 Exam	
18-22 Mar	<i>Spring Break</i>	
=> M4	Start Module 4: Nutrition & Transport	
25 Mar	Nutritional Needs & Adaptations Autotrophy, heterotrophy, mixotrophy	<u>Nutrition: what plants and animals need to survive</u>
27 Mar	Acquisition of Nutrients in Plants Soil processes, N ₂ -fixation	<u>Nutrient acquisition by plants</u>
29 Mar	Plant Transport Processes I Uptake of water and minerals Xylem and evapotranspiration Research Connection 3 due by 11:59pm	<u>Water transport in plants: xylem</u>
1 Apr	Plant Transport Processes II Phloem, sieve tubes, and translocation	<u>Sugar transport in plants: phloem</u>
3 Apr	Acquisition of Nutrients in Animals Structure and function of digestive organs Microbial roles in nutrition	<u>Nutrient acquisition by animals</u>

5 Apr	Animal Gas Exchange and Transport Principles of diffusion Lungs and gills Mechanisms for transporting O ₂ and CO ₂ Scientist Spotlight 4 due by 11:59pm	<u>Animal gas exchange and transport</u>
8 Apr	Animal Circulatory Systems Evolution of circulatory systems, heart structure, blood vessel structure and function	<u>Animal circulatory systems</u>
10 Apr	Mammalian Cardiac Cycle Human cardiac cycle, hormonal regulation	<u>Mammalian cardiac cycle</u>
12 Apr	Module 4 Exam	
=> M5	Start Module 5: Materials Balance & Homeostasis	
15 Apr	Animal Ion and Water Regulation Excretory mechanisms and systems Adaptations in different environments	<u>Animal ion and water regulation</u>
17 Apr	Mammalian Kidney Mammalian kidney function and hormonal regulation	<u>Mammalian kidney</u>
19 Apr	Plant and Animal Environmental Responses Photosynthetic strategies & water conservation Thermoregulation Optional Research Connection 4 due 11:59pm; <i>RC4 may be used to replace lowest grade on any previously submitted writing assignment; late submissions will not be accepted, and the two allowed late submissions may NOT be used for this assignment</i>	<u>Plant and animal responses to the environment</u>
22 Apr	Course synthesis	
26 Apr	Final Exam - Cumulative Friday, April 26 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 but not less than 1 minute per question.</i>	
	<i>Final exam guidelines can be found here:</i> https://registrar.gatech.edu/info/exam-guidelines	