

Biology 1311: Integrative Biology

Spring 2022

Instructors: Dr. Gerard Beaudoin CSI 326, x8857, gbeaudoi@trinity.edu, he/him
office hours: Tues/Thurs 8:30-9:30am, Tues 1-3pm
Dr. Michele Johnson CSI 419, x8918, mjohnso9@trinity.edu, she/her
office hours: Wed 12-2pm, Thurs 2-4pm

Office hours are the times we set aside to meet with students and answer your questions. **You do not need an appointment to visit office hours – just come on by**, by yourself or with a friend! If you'd like to meet with an instructor at a time outside of office hours, please contact us to make an appointment.

Peer Tutors:

Aaron Elfezouaty (he/him), Head PT	aelfzou@trinity.edu
Esha Gupta (she/her), Head PT	egupta@trinity.edu
Aly Baldwin (she/her)	abaldwin@trinity.edu
Gabriel Dominguez (he/him)	gdomingu@trinity.edu
Malcolm Gavigan (he/him)	mgavigan@trinity.edu
Mia Kholy (she/her)	mkholy@trinity.edu
Swathi Ravi (she/her)	sravi@trinity.edu

Instructor and Peer Tutor office hour times, locations, and zoom links will be posted on the [class Google calendar](#).

Lecture: Tuesday and Thursday, 9:55-11:10AM (BIOL 1311-1); 11:20AM-12:35PM (BIOL 1311-2), in Stieren Theater.

Course description: BIOL 1311 is an introduction to the study of living organisms – how they work, how they interact, and how they change. Our course is organized into three modules: 1) The Essentials of DNA, 2) The Evolution of Diversity, and 3) The Ecology of the Microbiome. In each module, we will explore the dynamic relationships among molecules, cells, organisms, populations, and ecosystems. Because biology is a rapidly changing field with important connections to many aspects of our lives, it is far more than a collection of facts that you can simply memorize. Each module will require you to apply your knowledge of biology to issues facing our society, using the scientific method as a framework.

Course goals & objectives: *We want each of you to excel in this course.* As instructors, our goals are for you to:

- Understand the basic biological concepts presented in lectures, activities, and readings.
- Achieve an understanding of science as a way of knowing about the world.
- Develop critical thinking and problem-solving skills and strategies.
- Understand that biological problems may be approached from a variety of perspectives, from multiple levels of analysis.
- Apply what you have learned in the field of biology and the world beyond.

To do your best work in this class, we suggest that you:

- Attend class (or watch the recording of any missed classes before the next class meeting).
- **Before each class**, watch any prelecture videos, then read the assigned readings, and answer readiness check questions. If you're not sure about your answers to the readiness checks, work with your study partners or ask questions in office hours *before* you submit your responses!
- Engage in all class activities, including actively participating in groupwork.
- Take notes during class.
- Recruit 2-4 students to create a study group. In your study group, compare class notes, and quiz one another on class material.
- Reduce distractions while reading and studying. You may find it effective to focus on your work for a short time (say, 25 minutes), and then take a quick (5 minute?) break – and repeat!
- Visit instructors and peer tutors to clarify and discuss the material.
- After exams, carefully and honestly evaluate your exam performance, and adjust your study and time management strategies as needed.

Diversity, Equity, Inclusion, and Justice in Biology: Dr. Johnson and Dr. Beaudoin are deeply committed to creating an environment where all students of all identities are supported as you learn biology. As a member of this class, we expect that you will contribute to a respectful, welcoming community including all members of our course. If our course environment does not meet these standards, we encourage you to let us know, without any fear of retribution.

Course materials: The text for the course is ***Biology: How Life Works 3rd Edition***, written by Morris et al. and published by W.H. Freeman and Company. Additional readings for the course, all course lecture slides, and descriptions of all assignments will be provided via the TLEARN website. We have indicated readings for you to complete before each lecture in the course schedule.

Participation, attendance, and absences: We use a system called PollEverywhere throughout this course. Because Trinity University has a site license for PollEverywhere, there is no cost for you to register. However, you must create an account and have a smart phone, tablet, or laptop to use it in class. **If you do not have regular access to one of these devices, please contact Dr. Johnson or Dr. Beaudoin.** PollEverywhere allows us to teach in a highly interactive manner, to assess how well you are learning the material as we proceed through each lecture, and to keep you engaged during class.

Whenever possible, we expect you to attend each class meeting, and *we require you to wear an appropriate mask over your nose and mouth for the entirety of each class period.* However, we recognize that there may be occasions that will not allow you to attend class, and *if you may be sick, we do not want you to attend class.* If you miss a class or part of a class for any reason, you will not be penalized in any way, **as long as you complete the PollEverywhere questions before the next exam.** We will record all class sessions, and these recordings will be available through a link on TLEARN. You will be able to answer and receive credit for PollEverywhere questions whenever you watch the lecture.

Assessment: We will assess your progress in this course through pre-class readiness check questions, in-class participation (via Poll-Everywhere and group activities), a current research analysis, an infographic assignment, four mid-semester exams, and a final exam. A portion of the final exam will be dedicated to testing your comprehensive understanding of the course. Your lowest grade on the first four exams will be dropped, but you may not drop your grade on the final.

Three of four mid-semester exams (lowest dropped), each worth 15%	45%
Final exam	20%
Current research analysis (introduced Feb 22, due March 25)	10%
Infographic assignment (introduced March 29, due May 6)	10%
Readiness check scores	7.5%
PollEverywhere scores	7.5%
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Total	100%

Grades will be assigned as follows: A = 90 and above, B = 80-89, C = 70-79, D = 60-69, and F = lower than 60.

What if I miss an exam? We understand that due to illness, quarantine, or other extenuating circumstances, you may be unable to attend class on the day of an exam. If this happens, communicate with the instructors as soon as possible. We will work with you to take the exam at a reasonable time.

Course requirements: Because this course, in combination with BIOL 1111 (Introductory Biology Lab), fulfills the requirement as an **Approaches in the Natural Sciences** course, there are specific course requirements. In BIOL 1311 and 1111 you will:

1. apply scientific reasoning to the collection and evaluation of data in order to solve problems within the context of an existing body of scientific knowledge.
2. learn how scientific studies are designed and executed, and recognize the implications of design choices.
3. apply quantitative reasoning techniques, such as statistics or model development, in the analysis and evaluation of scientific data.
4. effectively communicate the data and results of scientific studies.
5. find and critically analyze sources of scientific information.
6. apply scientific concepts/research to the natural world.

Learning outcomes: Upon successful completion of a Natural Sciences course as part of the Pathway Curriculum, students will have demonstrated the ability to:

1. identify and articulate the difficulties and choices related to data collection by either (a) planning and conducting data collection or (b) acquiring a “raw” (non-processed) data set and investigating the methods by which it was collected (metadata).
2. effectively use quantitative methods such as statistical analysis or model construction to interpret data.
3. produce effective visual representations of scientific data (e.g., a graph) and communicate a scientifically valid interpretation of visually represented data.
4. apply the results of scientific concepts and research to the natural world.

Trinity University academic honor code: All students are covered by a policy that prohibits dishonesty in academic work. Under the Honor Code, a faculty member will (or a student may) report an alleged violation to the Academic Honor Council. It is the task of the Council to investigate, adjudicate, and assign a punishment within certain guidelines if a violation has been verified. **Students are required to write on all work that is submitted for a grade: “On my honor, I have neither given nor received any unauthorized assistance on this work” and their signature. The pledge may be abbreviated “pledged” with a signature.**

Electronic recordings of course instruction: The COVID-19 pandemic requires the delivery of online instruction. For this reason, please be aware that all classroom instruction, including student participation in classroom activities, is subject to recording and dissemination on the University’s secure course management system (TLEARN). The recordings will be made available only to students enrolled in the course to facilitate online learning and review. Students are expressly prohibited from capturing or copying classroom recordings by any means; violations will be subject to disciplinary action. Instructors who wish to use a recording outside of class must obtain the written consent of any students who are personally identifiable in the recording.

Note on accommodations: Disabilities reflect differences in how our brains and bodies work, and understanding how you learn is the first step to success. If you have a disability and will need accommodations in this class, please speak privately with Dr. Beaudoin or Dr. Johnson early in the semester so that we can be prepared to meet your needs. All discussions will remain confidential. If you have not already registered with Student Accessibility Services, please contact the office at 999-7411 or sas@trinity.edu.

Sexual misconduct reporting: If you have experienced sexual misconduct, you may wish to seek out a trusted professor with whom to talk. You should know that most faculty and staff are “Mandatory Reporters,” including Dr. Johnson, Dr. Beaudoin, and all Peer Tutors. What that means is that we are *required by Texas law* to report any instances of sexual misconduct that we are aware of to the Title IX Coordinator, including sexual harassment, non-consensual sexual intercourse, non-consensual sexual contact, sexual exploitation, intimate partner violence, stalking, and related retaliation. So, if you share information with us about any incidents that implicate the Sexual Misconduct or Anti-Harassment Policies, we are required to report all information to the Title IX Coordinator to make sure you have information about support resources and complaint resolution options. **A “report” does not initiate the complaint process; you are in control over how to engage with our Title IX Coordinator.** Information about reporting is available here: <https://inside.trinity.edu/human-resources/equal-opportunity-services/sexual-misconduct/reporting>. If you wish to talk with someone confidentially who is not a Mandatory Reporter, you may talk with staff in Counseling Services, Health Services, or the University Chaplain. (All other university faculty and staff, including those in Residential Life, are Mandatory Reporters.)

Additional support services:

Student Success Center	<p><i>The Student Success Center encompasses multiple offices across campus. Their holistic approach helps students identify roadblocks to academic and personal success, while ensuring all students have access to comprehensive services.</i></p> <ol style="list-style-type: none"> 1. <u>Academic Support</u>: <i>time management, study skills, test anxiety, notetaking, tutoring</i>; https://www.trinity.edu/directory/departments-offices/academic-support, Coates Library, Room 308, Betty Curry (director), 210-999-7613, bcurry@trinity.edu 2. <u>Counseling Services</u>: <i>help with personal problems or mental health concerns</i>, https://www.trinity.edu/directory/departments-offices/counseling-services, 210-999-7411 3. <u>Health Services</u>: <i>help with illness or injury</i>; Myrtle McFarlin Residence Hall, 210-999-8111, healthservices@trinity.edu 4. <u>Student Accessibility Service (SAS)</u>: <i>accommodations for a diagnosed disability</i>; Coates Library, Room 308, 210-999-8528, sas@trinity.edu 5. <u>Wellness Center</u>: <i>help with nutrition, sleep, or managing stress</i>; https://www.trinity.edu/directory/departments-offices/wellness 6. <u>Writing Center</u>: <i>help with starting paper, finding a thesis, drafting and editing</i>; Coates Library, Room 308, Jennifer Rowe, 210-999-8528, jrowe@trinity.edu 7. <u>Quantitative Reasoning and Skills Center</u>: <i>assistance with demanding math-related coursework</i>; Coates Library, Room 308, Luke Tunstall, stunstal@trinity.edu 8. <u>Career Services</u>: <i>major exploration, career guidance</i>; Coates Student Center, Suite 215, 210-999-8321, careerservices@trinity.edu
ITSupport	<p>If you have a hardware or software problem, including an issue with TLEARN, please contact the ITSupport at helpdesk@trinity.edu, or 210-999-7409.</p>
CSI ASO	<p>The Administrative Support Office's (ASO) primary purpose is to provide logistic assistance to students, faculty, and staff in the Center for the Sciences and Innovation (CSI). The ASO office typically assists science students with the following:</p> <ol style="list-style-type: none"> 1. Handing out student work and exams 2. Access to rooms in CSI 3. Printer paper and toner for shared printers 4. Issues with CSI facilities <p>Location: CSI 253 (satellite in MMH 250); Phone: 210-999-8836 Hours of operation: M-Th 8-5 and F 8-4.</p>

BIOL 1311 Spring 2022 - Class Schedule and Reading List

Date	Topic of Class Session	Readings to Complete Before Class
Essentials of DNA		
Feb. 1	Welcome to the course! (Johnson, Beaudoin)	<i>To read after class: 1.1 (p. 3-8)</i>
Feb. 3	Chemical Building Blocks of Life (Beaudoin)	2.1-2.5
Feb. 8	DNA Structure and Replication (Beaudoin)	3.1-3.2, 12.1
Feb. 10	How DNA Makes a Phenotype (Johnson)	3.3-3.4, 4.2
Feb. 15	How Do RNA Vaccines Work? (Beaudoin)	4.1, 13.5, 41.3
Feb. 17	Exam 1	
Evolution of Diversity		
Feb. 22	Mutations: The Source of Variation (Beaudoin)	14.1-14.4
Feb. 24	What's in a Genome? (Johnson)	Case 3 (p. 252-255), 12.3 (p. 266-268, 272-273), 13.1, 13.3; listen to "Big Biology" podcast (TLEARN)
Mar. 1	How Cells Divide: Mitosis and Meiosis (Beaudoin)	11.1-11.4
Mar. 3	Diversity of Sex and Mating Types (Johnson)	16.1-2, 16.4; Montanez 2017 (TLEARN)
Mar. 5 - Mar. 13 Spring Break		
Mar. 15	Sexual Differentiation (Beaudoin)	36.2, 36.3 p.822, and 40.3-40.4 (p.911-916)
Mar. 17	Exam 2	
Mar. 22	Tracing Evolution: Interpreting a Phylogeny (Johnson)	22.1-2
Mar. 24	Mechanisms of Evolution: Selection and Drift (Johnson)	20.1, 20.4, 20.5
Mar. 25	Current Research Analysis due	
Mar. 29	"Nature vs. Nurture" (Heritability and Plasticity) (Johnson)	17.1-2
Mar. 31	Evolution of Human Race (Johnson)	23.2, 23.4; Gibbons 2014 (TLEARN)
Apr. 5	Exam 3	
Ecology of the Microbiome		
Apr. 7	Infographics: How to design them (Beaudoin, Johnson)	Reading TBA
Apr. 12	The "Invisible" Diversity of Microbes (Johnson)	24.1, 24.4-24.6; Case 5 (p. 514-517)
Apr. 14	How Cells Use Energy: Metabolism (Beaudoin)	6.1-6.4
Apr. 19	How Cells Use Energy: Enzymes (Beaudoin)	6.5 and 24.2
Apr. 21	Building a Community of Microbes (Johnson)	45.1-45.4
April 26	Exam 4	
April 28	How Cells Use Energy: Respiration (Johnson)	7.1-7.6
May 3	Microbial Origins of Biomedicine (Beaudoin)	12.3 (review and 269-272), May et al. 2015
May 5	The Study of Microbes and CRISPR (Beaudoin)	12.4, Jinek et al. 2012, Ledford & Callaway 2020
May 6	Infographic due	
May 10	Wrapping Up the Semester (Johnson, Beaudoin)	Tentatively: McFall-Ngai et al. 2013 (TLEARN)
May 14	Final Exam, Common Exam Period II, 3:30-6:30 p.m.	