

EVOLUTIONARY BIOLOGY (BIOL 5250) SPRING 2021

Class meetings: Zoom, 1:30–2:45 pm, Tues. & Thurs.

Website: Canvas

Instructor

Teaching Assistant

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TBA

Virtual Office Hours: Mon. 12:00-3:00 pm

TBA

1 DESCRIPTION OF THE COURSE AND LEARNING OBJECTIVES

In this course we will get an overview of modern evolutionary biology, with a focus on the process of science. A good understanding of the processes and mechanisms of evolution will be our primary goal. By the end of the course you should be able to (1) make predictions and generate testable hypotheses based your understanding of the evolutionary process, (2) apply evolutionary thinking to real-world problems, and (3) respond to major misconceptions regarding evolution. Along these lines, this course is designed to address the following IDEA learning objectives:

- learning fundamental principles, generalizations, or theories
- learning to apply course material in problem solving, and decision making
- learning to analyze and critically evaluate ideas, arguments, and hypotheses

Although this is an introductory course in evolutionary biology, it is not purely a lecture-based course. I will offer lectures, explanations and examples to introduce and clarify material, but we will also discuss material and perform active, hands-on activities. This will require all of us to come prepared to each class. Part of my job will be to make clear what the preparation for each class entails. It should be clear from the outset that this course is built around your regular, active preparation for class meetings.

2 COURSE MATERIALS

A text book is not required for this course. But I will use material from the following textbook, which you are encouraged to use as a reference. Required articles from the primary literature will be provided in pdf format via the course website.

- J. C. Herron and S. Freeman. 2014. *Evolutionary Analysis*. Fifth Edition. Pearson Prentice Hall, NJ.

3 ATTENDANCE AND PARTICIPATION

Learning in class is a communal endeavor as well as an individual undertaking. You are expected to be present and prepared at the designated time for every class and to remain engaged in class activities throughout the time allotted for class. Coming to class prepared includes reading selections from the primary literature, completing any assignments, and reviewing your lecture notes.

4 ASSESSMENT

Formative and summative assessments will be used to evaluate and enhance student learning. Specific forms of assessment will include short quizzes, think-pieces (see below), a research project proposal and report, and three exams. Brief overviews of these assignments follow. See Canvas for more information. Due dates for all assignments can be found on Canvas. Unless prior arrangements are made with me (that is, before an assignment is due), late work will not be accepted. In other words, contact me if you have a planned, excused absence or fall ill before an assignment is due so that we can work out a plan for late work.

Quizzes	0%
Think-pieces	15%
Proposal	15%
Report	20%
Exam 1	15%
Exam 2	15%
Final exam	20%

Letter grades will be calculated on the standard USU scale:

A = 93 – 100, A⁻ = 90 – 92, B⁺ = 87 – 89, B = 83 – 86, B⁻ = 80 – 82, C⁺ = 77 – 79, C = 73 – 76, C⁻ = 70 – 72, D⁺ = 67 – 69, D = 60 – 66, and F < 60. Your final score will be **rounded downward** to the nearest integer value when assigning letter grades. In other words, a 79.9 is a C⁺ not a B⁻.

4.1 PARTICIPATION AND QUIZZES (0%)

During each class, you will have opportunities for active participation and learning. This could involve, for example, small group discussion in break-out rooms, short written reflections, or larger class activities. I will use various means to obtain feed-back from participation in these activities. For example, you might be asked to post something online to a wiki page or the Canvas site. No points will be assigned for participation, but these activities will contribute to your overall learning experience.

To be successful you should review your lecture notes regularly and read from the optional text book or other sources as needed. To encourage and facilitate this, we will have quizzes throughout the semester. These short quizzes (usually two or three questions) will be administered through Canvas. These quizzes are optional; they do not directly affect your grade. However, they provide a means for you to assess your mastery of course content and for me to identify potential areas where the class is struggling. Taking these quizzes is one useful thing you can do to prepare for the exams.

4.2 THINK-PIECES (15%)

As biologists you will need to read and analyze scientific papers. Thus, as part of this course you will read, analyze (in writing), and discuss recently published scientific papers. The written component that is associated with and responds to each assigned reading is called a think-piece. Think-pieces should contain discussion, critical analysis, and reasoned opinion, as opposed to a simple factual summary. Think-pieces should address the key concepts associated with the topic, as well as highlight the most important findings or other aspects of the reading, and make connections between the journal article and the material we have discussed in class. You should complete a draft of your think-piece before class on the day it is due. Then, during class you will be given questions or prompts associated with the scientific paper to discuss in small groups. You will then have an opportunity to revise your think-piece before submitting it later in the day. Think-pieces should be approximately one page long. We will have four think-pieces; Canvas will automatically drop your lowest think-piece grade.

4.3 RESEARCH PROPOSAL (15%) AND REPORT (20%)

Science is often a collaborative endeavor. Scientists develop hypotheses, design and conduct experiments, analyze and interpret data, and communicate their findings with other scientists and the public. As part of this course, you will complete a major research projects that will help you develop these skills and delve deeper into important topics in evolutionary biology. The focus of this project is on the consequences of selection in a changing or heterogeneous environment. In this project, you will work in a group to develop a research proposal, conduct a computer-based experiment (with SLiM3), and analyze and interpret scientific data. You will then describe your findings in a research report (each student will write and turn in their own report). You will work with USU Writing Fellows on each part of this project (failure to do so will result in a 0 for the assignment). I will provide detailed instructions and expectations for each assignment via Canvas, and this will include detailed grading rubrics. A portion of this work will be done in class, but you will also need out of class time to complete these assignments.

4.4 EXAM 1 (15%), EXAM 2 (15%) AND FINAL EXAM (20%)

There will be three exams—two midterm exams and a final. All three exams will be administered through Canvas during our regularly-scheduled meeting time or final exam time. Each exam will include ~25 multiple-choice questions focused on the material since the previous exam. In addition, the final will include a comprehensive essay question (worth 25 points out of the 100 points for that exam). Before the final exam, you will be given a list of key topics to study and review. I will develop three questions based on these topics for the final exam. You will chose one of these three questions to answer. In general, you can expect the essay questions (and even many of the multiple choice questions) to require some combination of quantitative and qualitative analyses, application of knowledge to problems, and synthesis of ideas. My hope is that the final exam will require you to think rather than to simply memorize terms and concepts, and will, to the extent possible, emphasize the process of science. You are not permitted to use notes or your book on any of the exams. The exams might require arithmetic; you are invited to use a calculator.

5 SCHEDULE OF TOPICS

See the the course home page on Canvas for the schedule of topics, along with links to required readings, due dates for assignments, and other course resources (e.g., slides/notes).

6 ADDITIONAL ITEMS

- The schedule of topics, assignments, and all other details in this syllabus are subject to change with fair warning.
- USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.
- Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and USU Policy 339 address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU's Affirmative Action/Equal Opportunity (AA/EO) Office for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment (USU Policy 305), and has designated the AA/EO Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

- Mental health is critically important for the success of USU students. As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Utah State University provides free services for students to assist them with addressing these and other concerns. You can learn more about the broad range of confidential mental health services available on campus at Counseling and Psychological Services (CAPS).

Students are also encouraged to download the "SafeUT App" to their smartphones. The SafeUT application is a 24/7 statewide crisis text and tip service that provides real-time crisis intervention to students through texting and a confidential tip program that can help anyone with emotional crises, bullying, relationship problems, mental health, or suicide related issues.

- Students whose religious activities conflict with the class schedule should contact me at the beginning of the semester to make alternative arrangements.

- Cheating and other forms of academic dishonesty are listed in The Code of Policies and Procedures for Students at Utah State University (revised September 2009), Article VI, Section 1. If you are found to be engaged in academic misconduct, at a minimum you will receive no credit for that exam or assignment. Repeat or serious offenders can expect more serious consequences.
- In order to continue to provide various forms of face-to-face instruction at USU, and to limit the spread of COVID-19 during the pandemic, students are asked to follow certain classroom protocols during the fall 2020 semester. These protocols are based on CDC, state, and local health department guidelines and requirements are in place not only for your safety but also the safety of the entire campus community.
 - Face coverings are required in all classrooms and teaching laboratories. Students will not be permitted to remain in class without a face covering, as per University Policy 20T.3. Students that do not adhere to the face covering policy will be referred to the Office of Vice President for Student Affairs for a possible violation of the Student Code of Conduct. There may be individual medical circumstances that prevent some students from using face coverings. If you require this exemption, contact the Disability Resource Center prior to the start of classes to investigate alternative instruction. These circumstances will be rare, but if they do exist, we ask that everyone be respectful.
 - Follow faculty instructions regarding social distancing and entering/exiting classrooms.
 - Stay home when you are sick, however mild your symptoms.
 - Wash your hands frequently with soap and water.