Biology 3250, Ecology and Evolution, spring 2021

Professor: Corey Devin Anderson, Ph.D. (Evolution, Ecology, and Population Biology)

Preferred salutation: "Dr. Anderson"

Course Format:

Traditional Face-to-Face (F2F): Face-to-face classes generally have the following:

- a scheduled meeting place and
- a scheduled time and day(s) of the week.

Lecture location: BSC 1024
Days and time: Monday/Wednesday, 2:00 to 3:15 PM.

Lab location: BSC 3019 (Chemistry Computer Lab)

A) Monday, 10:00 to 12:50 PM
B) Tuesday, 2:00 to 4:50 PM

Final exam:
Tuesday 04 May: 2:45 to 4:45 PM.

Virtual Office Hours: Thursday 9:30 to 11:30 AM (MS Teams). Email to schedule.
E-mail: coreanderson@valdosta.edu

The lectures provide a survey of key topics in the disciplines of ecology and evolution; the labs are intended to reinforce the lecture material, as well as to provide further training in statistical, computational, and field-based methods in ecology and evolution. The lab component of this class will also provide students with some training in scientific writing.

Standards
Education outcomes for BS Degree in Biology: 1, 2, & 5.
VSU General Education Outcomes: 3, 4, 5, & 7.

***Policy on appointments and "drop-ins"**
If you need extra help or clarification, the best method is Email (I try to be very responsive); after class or lab is usually also a good time for help. Office hours are little different this semester, since they are virtual. I don't mind scheduling appointments outside of office hours (I encourage students who are struggling to seek help), but I ask that you please try to take advantage of scheduled class times and office hours, if possible, as I cannot always accommodate meetings outside of the course schedule.

Attendance policy (COVID-19 edition)

This is a face-to-face course. It is NOT designed to be online or hybrid and, honestly, as is, it does not translate well into those formats.

For students who are forced into quarantine due to COVID-19 (and have followed the appropriate procedures) they may attend the lecture or in-class labs via Collaborate Ultra.

Just because lectures may occasionally be broadcast, this does not mean that it is a substitute for coming to class. I will only broadcast and/or record lectures when there is a student in quarantine with an official clearance from student affairs. I will use live lecture attendance as an additional factor to consider for students with borderline grades.

This is also a challenging course, missing lectures or labs (for reasons other than illness) is just a bad idea that will likely affect your grade. Beware that attendance is ***required*** for all laboratories. There are no make-up labs. For in-class labs, I simply do not have the extra time to go over an intricate three-hour lab with students who happen to miss class. If there are extenuating circumstances, talk to me, and we will work something out.

Do not be excessively and consistently late for lab or lecture, especially field labs.

Course overview and philosophy

This course is an introduction to ecological and evolutionary theory. Although ecology and evolution are presented as separate disciplines, their interaction is emphasized and proficient knowledge of how ecology and evolution interact is a major learning goal and requirement for passing this course.

While the course presents an integrated view of ecology and evolution, in the first half of the class, the focus is on evolution. Macroevolutionary concepts are discussed in detail, but my presentation of the course is admittedly biased towards population genetics and microevolutionary theory. The emphasis on microevolutionary mechanisms partly reflects the fact that this is my area of expertise and I feel most comfortable teaching this material. But more importantly, I believe that a solid background in microevolutionary mechanisms helps to reinforce the connection between heredity (i.e. genetics) and microevolution, as well as the connection between microevolution and macroevolution.

While basic comprehension of biological evolution requires a solid foundation in microevolution, the theory underlying this subject is largely based on probability theory applied to population genetic data. The quantitative nature of the subject makes it challenging for some students and teachers, so it is often underemphasized in most evolution textbooks (usually given a chapter or two, at most). In the present course, by choosing to emphasize microevolutionary theory, I have taken the opposite approach. My hope is that this emphasis will provide my students with a sound understanding of the mechanisms underlying evolutionary change at the most basal level (i.e., the population), and that enhanced training with this subject will put my students at an advantage over others who have received less instruction in this arena. Finally, I would like to note that most of the development of evolutionary biology over the last several decades has been perpetuated by technology breaks in molecular genetics; therefore, students in the modern era need to develop a good grasp of the genetic mechanisms underlying biological evolution.

At a certain point in the course, the focus shifts from evolution to ecology. In teaching ecology, I prefer a hierarchical approach, starting with interactions between individuals in a population (i.e., population ecology) and then subsequently covering interactions between species in a community (i.e., community ecology). However, to facilitate completion of the final paper, I sometimes vary my presentation of certain subjects in ecology, depending on the nature of the course project.

As both ecology and evolution have to be covered in the same semester, there are surely many important subdisciplines and topics in evolution and ecology that are not covered in sufficient detail. Students requiring training in these areas are encouraged to investigate the topics independently, or to seek out more focused courses on these subjects.

Note that development of modern ecological and evolutionary theory has been largely based on quantitative models. These quantitative models usually present themselves as equations. However, as opposed to a course in mathematics, the goal is not simply to be able to manipulate and solve the equation, but rather to be able to model the concept. The conceptual nature of the subject represents a departure from the manner in which most biology students have been trained. This challenge is exacerbated by the fact that most students have not had previous training in ecology and evolution. These challenges, combined with the shear breadth of the material, may make this a very challenging course for some students. You are strongly encouraged to "keep up" with the material.

Grading

I use a rank-based (or "stack rank") grading system; this means that you will be evaluated based on how well you perform (in terms of your point total) relative to other students in the class. I have taught this course many times, so I also have a good data on relative class performance, which I consider when evaluating point totals.

When possible, I like to use natural breaks in the point distribution to determine letter grades. For example, if there is a substantial point differential separating the top five students in the class from the remaining students, these top students would typically receive an "A". Conversely, natural breaks at the bottom of the distribution determine those students that do not pass (i.e., D/F). In the case that discrete natural breaks in the distribution do not exist, I will use quartiles of the distribution to assist in parsing the distribution.

There are approximately 850 points* that can be earned in this course, 450 points from exams and 400 points from laboratory exercises. There will be three unit exams (all multiple choice format), each worth 100 points. My multiple choice tests are designed to be challenging; I expect the median score to be ≤ 65. There will also be a cumulative final (essay questions) worth 150 points. **I consider the final exam to be very important.** For students near the "borderline" (i.e. at or just below the cutoff for a passing "C"), your performance on this final test may influence my decision as to whether you will pass or fail. I will also consider your performance on this test if you fall near the cutoff between other letter grades (e.g., C/B and B/A).

The laboratory exercises come in various formats, but a big chunk of your score will be based on a written scientific paper (worth ~ 250 points or 62.5% of your lab grade)*. All other labs are worth 30 points each. Unless otherwise noted, labs are due at the beginning of the next lab. Labs that are turned in late will be penalized depending on the circumstances and severity, and I do not grade late labs after assignments are returned. Because this course is based on relative performance, receiving a zero on a lab can destroy your grade, so make sure you turn-in all assignments in a timely manner.

If you miss an assignment due to illness or hospitalization (not related to COVID-19 infection), please provide verification of illness in the form of a doctor's note. I will work with those students to find a solution, depending on the circumstances.

Note that laboratory exercises and attendance (explained below) comprise 50% of your final grade. This means that a strong performance in lab can raise your rank considerably; conversely, a poor performance in lab can also drop your class rank. In my opinion, success in the laboratory part of this class is primarily a function of effort and attention to detail. It is the primary manner by which effort is evaluated.

*Because of COVID-19, the laboratory point total will be lower in spring 2021. The final paper will be reduced this semester (instead, we will work on writing and re-writing introductions, methods, and references)…and, maybe, go outdoors, or use the time for recitation.

Books

"Required" texts:

1) Population Genetics and Microevolutionary Theory by Alan R. Templeton; the publisher is Wiley.

Recommended texts:

2) Ecology: Global Insights and Investigations by Peter Stiling; the publisher is McGraw Hill.
3) A Primer of Ecology by Nicholas J. Gotelli; the publisher is Sinauer Associates, Inc.
4) Any general textbook on evolution or ecology.

Statement on textbooks:

Unfortunately, there is only one text book in print that covers both ecology and evolution in tandem; for various reasons, I have chosen not to use this particular book. On the other hand, there are many text books that cover ecology and evolution as separate subjects, and many general ecology textbooks include some evolution.

I am only requiring one book (Templeton). The pop gen book may be considered "overkill" by some, as its level is relatively advanced and it contains some information that is beyond the scope of the present course. However, as much time is spent covering microevolutionary theory, I think students will benefit from the additional examples and practice problems contained in this book. Moreover, many of my lectures on this subject are based directly on this text, so reading the book should help to reinforce some of the more challenging lecture material. In my opinion, this is the hardest part of the course for students, and many students have told me that reading the book in tandem was very helpful.

For various reasons, including cost, I have decided not to require an ecology book this semester. However, some students might consider buying or "checking out" a general textbook on ecology or evolution or buying an E-book. Most of these textbooks cover the same topics and most of the topics are covered in this course. Reading another source to reinforce the course material could be very helpful (just remember to skip the stuff we do not cover).

Field trip attire

We will be taking multiple field trips into inhospitable areas and during most of these field trips we will be "off trail". You need to wear long pants and closed toed shoes; long sleeve shirts are also recommended. To avoid mosquitoes and overheating, wear light (or earth) colored clothing. During some of these trips, you will like get muddy, wet, and downright dirty; so don't wear "nice" clothes. Insect repellent, hats, and/or sunscreen are also suggested. Don't forget to bring drinking water and to eat something before we leave (or bring food along). Some of the places we visit may not have restroom facilities, so please relieve yourself prior to departure or be prepared to use "outdoor facilities," if required.

Writing and plagiarism policy

For writing assignments, stringing together phrases and sentences from published sources is considered plagiarism and will result in a zero on that assignment. **NEVER copy lab assignments or papers from previous semesters; if you do this, you will probably fail Biology 3250.** For some of the labs, I do not mind if you work as a team; however, **for writing assignments, you must turn in your own original work** (even if you did the analyses as a team).

Cheating policy

Do NOT cheat on exams. You will receive a zero on the exam and will be reported to the Dean of Undergraduate Academic Affairs.

Calculator policy

Although I try to avoid writing test problems that require hand-held calculators, some questions may be facilitated by use of a calculator….so remember to bring one to the unit exams.

Cell phone and computer policy

Unless you have special permission, **cell phones use is strongly discouraged during lecture**. Students who have cell phones out during exams will receive a zero on that exam. Any student caught photographing an exam will get an automatic "F" in Biology 3250, and will also be banned from retaking the course with Dr. Anderson. Laptops are computers OK in lecture (and obviously necessary if you attending remotely due to illness or quarantine), as long as they are being used to follow along with material in lecture and not for other purposes (or other courses).

Policy on audio recordings

I prefer that my lectures and labs not be recorded without my consent, but if you feel as if you need to record my lecture, please place your recording device in the front of the classroom, so that I am aware that I am being recorded.

Students with disabilities

Students requiring classroom or testing accommodations because of documented disabilities should discuss their needs with the instructor at the beginning of the semester. Students not registered must contact the Access Office, Farber Hall, Phone; 245-2498. Website: http://www.valdosta.edu/access/
For some students, the presence of a medical condition places them at high risk for COVID-19. These students can use the online form to submit documentation of the condition to the Access Office to ensure confidentiality.

https://www.valdosta.edu/student/disability/forms/request-for-covid19-course-modification.php

The Access Office will then contact the advisor and department to indicate the receipt of documentation that supports the request for course substitutions or appropriate alternative assignments and virtual access to lectures.

Fall 2020 (addendum): VSU COVID-19 policies:

VSU cares about student success both on and offline, and a variety of resources are available to help studentsboth academically and personally during the Fall 2020 semester. One of the best resources is VSU's Coronavirus FAQ page located at https://www.valdosta.edu/health-advisory/faq.php. Information is available there about a variety of topics in VSU's return-to-campus plan.

A website devoted to the health and wellness of VSU students can be seen at https://www.valdosta.edu/administration/finance-admin/campus-wellness/student-resources.php.

You can find information, including how you can access the Brightspace Pulse app that will allow you to view BlazeVIEW on your smartphone at https://www.d2l.com/products/pulse/. In BlazeVIEW, all VSU students have a course with guides for how to use tools in BlazeVIEW; search for "VSU BlazeVIEW Student Tutorial 2020."

Face coverings:

In response to the best available science and current guidance from the Centers for Disease Control and Prevention and the Georgia Department of Public Health, **every student must wear a face covering that covers their nose and mouth at all times while in any campus building, including in this classroom.** This requirement is intended to protect the health and safety of all VSU students, the instructor, and the entire university community. Anyone attending class without a face covering will be asked to put one on or leave. Students should also be sure they maintain a distance of at least six feet away from their fellow students and instructor and are seated in a seat that is designated to ensure that distance. Students who refuse to wear face coverings appropriately or adhere to other stated requirements may face disciplinary action for Code of Conduct violations.

During field trips (which are outdoors) students are required to wear face covering when close proximity to other students. You may remove your face covering in the field given you are more than six feet away from another student or instructor (but you must be ready to put it back on when in the presence of others).