Course overview

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, prefer a hierarchical approach, starting with interactions between individualscsa heredsed toward, prefer a

material, may make this a very challenging course for some students. You are strongly encouraged to "keep up" with the material.

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.

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 900 points that can be earned in this course, 450 points from exams, 400 points from laboratory exercises, and 50 points for attendance. 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. For stude

"Required" texts:

1) Population Genetics and Microevolutionary Theory by Alan R. Templeton; the publisher is Wiley.
2) Ecology: Global Insights and Investigations by Peter Stiling; the publisher is McGraw Hill.

Recommended texts:

3) A Primer of Ecology by Nicholas J. Gotelli; the publisher is Sinauer Associates, Inc.
4) Any general textbook on evolution, such as:

Bergstrom CT. Evolution. Norton.
Futuyama DJ. Evolution. Sinauer Associates, Inc.
Hall BK. Evolution Principles and Processes. Jones and Barlett.
Herron JC, Freeman S. Evolutionary Analysis. Pearson.
Ridley M, Evolution. Blackwell.

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, but each text has its own strengths and weaknesses. For example, many ecology books are great for illustrative examples and basic concepts, but do not do a good job at explaining the mathematics underlying the various models. I have chosen

Attendance is requisite for all laboratories and is strongly encouraged for lecture. I will randomly survey attendance in lecture 10 times during the course. Every time that you are present you will receive five points, for a total of 50 possible points. If you are planning to miss lecture or lab, you must contact me (via email) before the lecture or lab (unless it is an emergency situation).

There are not make up labs. If you are sick, a note is required from a health professional on official letterhead…and you must contact me ASAP (i.e., preferably via email the lab you are going to miss). Other excuses will be considered on a case by case basis. If you have a planned absence, you may participate in the other lab sections. It is very important that you are not late for field trips.

Although I will not take role every day of class, I may occasionally give a quiz or additional test questions (as required) during lecture.