

Principles of Ecology (Biol 4253)

Location, Time, Days

Instructor: Dr. Tad Dallas (tad.a.dallas@gmail.com)

Office: A343 Life Sciences

Course Overview:

Ecology is the study of species interactions. This broad umbrella covers levels of biological organization from individuals to entire ecosystems. We will explore ecological concepts across these different levels of organization, and gain an understanding of general ecological concepts. The course will focus particularly on population and community ecology, which aims to understand the processes which govern the abundance and diversity of species. However, we will also be addressing trophic relationships (e.g., predators eating prey), disease (e.g., epidemic spread), and mutualisms (e.g., plants and pollinators).

Course Goals:

Over the course, it is expected that students gain

- a conceptual foundation of ecological principles, from individuals to ecosystems
- the ability to link existing ecological theory to natural systems
- an appreciation for ecological systems

Syllabus Subject to Change:

Changes to the syllabus may be made during the semester. The most up-to-date and current syllabus will always be available on the course website (WEBSITE).

Required Reading:

I do not plan on teaching you to program in R, but this book provides a decent background, is freely available, and will compliment in-class demonstrations of ecological phenomena using R. That is, you will be exposed to programming as a means to demonstrate ecological theory, but you will not be required to learn or write code (if you don't want to).

Stephens. A Primer of Ecology with R. [pdf online](#)

Suggested Reading:

This text contains much of the same material, but covers it using a bit more math.

Gotelli's *Primer of Ecology* [link to book](#)

Grading

There will be a total of 500 points, consisting of four exams and a final project.

Exams:

There will be four exams given in this class. Although there will be no “comprehensive” exam, each successive section will build upon material learned in earlier sections. Thus, on Exams 2-4, students will be expected to draw upon major points from previous material covered. Exams will consist of any combination of the following types of questions: fill in the blank, multiple choice, short answer, essay or problem solving. *Each exam will be worth 100 points.*

As a rule, make-up exams will be essay or oral in form depending on the decision of the instructor and will be only available to those persons who have obtained prior approval or have a valid written excuse. We reserve the right to verify any excuse.

Group Project:

Students will complete a group project which will be presented to the class at the end of the semester (5-8 minute presentations). The project options are open, but must deal with an ecological topic covered in class. Topics must be approved by the instructor.

Audio-visual equipment can be [checked out from the library](#).

The group members should be prepared to answer questions from the classmates and your instructors about your project. You will be graded on your creativity, enthusiasm, accuracy and how clearly the project relates to the field of ecology.

The project is worth 100 points

Academic honesty

Louisiana State University adopted the Commitment to Community in 1995 to set forth guidelines for student behavior both inside and outside of the classroom. The Commitment to Community charges students to maintain high standards of academic and personal integrity. All students are expected to read and be familiar with the LSU Code of Student Conduct and Commitment to Community, found online at www.lsu.edu/saa. It is your responsibility as a student at LSU to know and understand the academic standards for our community.

Students who are suspected of violating the Code of Conduct will be referred to the office of Student Advocacy & Accountability. For undergraduate students, a first academic violation could result in a zero grade on the assignment or failing the class and disciplinary probation until graduation. For a second academic violation, the result could be suspension from LSU. For graduate students, suspension is the appropriate outcome for the first offense.

Further information is provided on the [LSU website](#)

Special needs statement

My goal is to help you learn. Students who have any difficulty (either permanent or temporary) that might affect their ability to perform in class can contact me privately, or reach out to the LSU Disability Services staff.

More information on registering a disability is available at [LSU Disability Services](#), located at 124 Johnston Hall. Contact the Center by telephone at 225-578-5919 or via email at disability@lsu.edu.

Schedule

What is ecology? - goals, shortcomings, history,

What controls population dynamics? - population demography (life tables), single species population dynamics,

How does individual behavior influence population processes? - dispersal processes, invasive species and traits thereof, Taylor's law and other associated theory, stochasticity

What is a species niche? - linking populations to the environment, abiotic tolerance, defining and quantifying the niche, niche models

What determines community composition? - competition, succession, stochasticity, historical contingency, priority effects, etc.

How does landscape structure influence population processes? - metapopulation dynamics, island biogeography,

What controls predator-prey interactions and dynamics? - cyclic populations, feeding responses, models, stability

What are the effects of parasites and pathogens? - dilution effect, population cycling, novel weapons, apparent competition, host switching,

How are plants and pollinators different? - phenology, stress gradient hypothesis, mutualism/commensalism/parasitism,

How does global environmental change influence ecology? - tie in all scales, land use change, climate change,

How do we scale small scale processes to global scales? - sometimes we can't, macroecology, the utility of theory,