BIOS 805 Principles of Ecology (2 credits)
Syllabus and Course Information

Instructor: Dr. Sabrina E. Russo
208 Manter Hall, 472-8387, srusso2@unl.edu

Office hours: By appointment

Course website: Blackboard

Class meetings: MWF 0930 – 1020, Manter 203

Required texts: Real, L.A. and J.H. Brown, 1991. Foundations of Ecology: Classic Papers with Commentaries. University of Chicago Press. *(on reserve at LOVE and CYT libraries)*
http://press.uchicago.edu/ucp/books/book/chicago/F/bo3613618.html

Citation Classics in Ecology

This course will consist of discussions of "citation classics" in ecology, with contemporary companion papers. A citation classic in ecology is a paper that has made a substantial contribution to our thinking about ecological processes, generating a lasting impact on a discipline or even the entire field of ecology, as indicated in part by an inordinately large number of times the paper has been cited. Often the impact of a classic is not immediate, but manifests itself through the contribution of its progenitors over time. Concepts that originated in citation classics are the ones we read about in text books.

Consider some of the best research seminars that you have heard. Most of these speakers link their work to the historical development of ideas in their discipline, which highlights the place of their own contributions. Similarly, devising compelling, conceptually based, and original research questions requires knowledge of the historical development of a field, especially the field's foundations.

Objectives

The overall objective of this course is to train students to think like an ecologist at the graduate level. This includes mastering skills such as (1) finding background material and primary literature to understand current research topics, (2) critically reading the current literature and assembling an integrative perspective of the development of an ecological research area, and (3) being able to develop and test hypotheses from an understanding of the theoretical and empirical literature in ecology. Students will not attain mastery of any of these skills through this course alone, but the course will set students on the path toward self-mastery. The course is designed for those graduate students whose research is in areas of ecology, evolution, and behavior.

Prerequisites and requirements

There are no formal prerequisites for this course. Students are expected to have basic knowledge of ecology, evolution, and behavior, at a level that would be presented in an undergraduate course. Beyond that, some ecological concepts encountered in the readings may be new or unfamiliar. In order to understand the readings, students are expected to use ecology text books, appropriate internet sources, or other sources to educate themselves about unfamiliar topics that must be understood to participate fully in discussion. Students are also encouraged to discuss unfamiliar topics with Dr. Russo outside of class or ask about them during discussion.

Details

The course grade will be determined by the following assignments:

1. Discussion: Choice of papers and Discussion leadership 30%
2. Participation: Semester-long in-class participation & preparedness for class: 10%
3. Review Paper Proposal: 10%
4. Review Paper: 30%
5. Peer-review of class-mates' Review Papers: 20%

Discussion: Class meetings will consist of student-led discussions of chapters and commentaries from *Foundations of Ecology*, combined with contemporary companion papers from the primary ecological literature. The goal of discussions is to provide you the opportunity to develop your skills to critically read and evaluate scientific literature, interpret and synthesize data and fundamental concepts in ecology, and understand how these research papers fit within the development of the field of ecology. Each student will select 1-3 chapters and commentaries from *Foundations* and do a thorough literature search on the topic covered in this chapter in order to find 1-2 contemporary companion papers from the recent literature. The forward citation search function in Web of Science is helpful in this regard. Companion papers should represent state of the art research or perhaps highlight a persistent or modern controversy on this topic. Companion papers should also not be excessively long (< 15 pages). The student assigned to lead the discussion will give a short introduction to the ideas/topic in the *Foundations* chapter, placing it in historical context with respect to the development of the field of ecology (drawing on the "Commentaries" chapters to do so). The majority of class time will be spent in discussion. The Foundations chapters to be covered will be selected by the students themselves, and each student will present at least once, perhaps more than once, during the course of the semester, depending on enrollment.

While not required, students are encouraged to meet with Dr. Russo ahead of the date that they are scheduled to lead the discussion in order to discuss their choice of contemporary companion papers. ***Students should email (via Blackboard) Dr. Russo and the other class members PDFs of companion papers no later than one week before their assigned discussion date.***

Although a schedule of topics/chapters and presenters will be made at the first class meeting, it may be changed if students wish to linger on a particular topic and address it in more depth, as long as there is sufficient course meetings remaining to do this. The schedule will be updated on Blackboard (BB). Students should consult with me in advance when they anticipate an absence from class.

How to lead a discussion: See the Discussion Guidelines PDF, posted on BB. In addition, questions to consider for leading discussions are: What are the fundamental contributions of the paper? If the paper addresses a controversy, what ideas or syntheses have helped resolve (or fuel) the controversy? How might remaining disagreement be resolved through additional observations or experiments or new methods? Participation and leadership will be assessed based on the level of preparation and the productiveness of the ensuing discussion, including knowledge of the assigned reading and clarity, creativity, and logic of the arguments.

Companion paper critique: For 5 of the 21 discussions, students will submit an essay (400-500 words in length) analyzing, or critiquing, the objectives, methods, and contributions of one of the

companion papers. Essays should identify strengths and weaknesses of the papers in relation to the historical development of the research area. Essays will be turned into Dr. Russo for credit, but will not be graded. They will be included as part of the Participation grade (2).

Review Paper and Peer Reviews: Students will write a Review Paper on a topic of their choosing in ecology. Review Papers should be 15-20 pages (double-spaced) in length (not including literature cited), written as a manuscript for publication in the style of the scientific journal, *Trends In Ecology and Evolution* (*TREE: http://www.trends.com/tree/about.htm#authors*). A ***proposal*** for your manuscript is ***due on March 21***. The proposal should have a provisional title of your manuscript and a 500-1000 word summary outlining the specific topics your review will cover and justifying why this topic is of interest to the readers of *TREE*. I would be glad to meet with you about your proposed topic before the proposal is due. As the mock-subject editor, I will return comments on your proposal, along with a grade, hopefully by March 23. The review paper will be ***due on April 23***.

Your Review Paper topic should interest you – feel free to address a topic directly related to your thesis research. In fact, this assignment could form the basis for the introduction to your thesis or a review paper you later submit for publication. Your Review Paper should be information-rich and demonstrate the depth of your understanding. You may also consider designing a conceptual figure regarding your topic for your paper.

Each student will be assigned two fellow class-mates' Review Papers (anonymously) and will conduct a peer-review of them. Students will evaluate the Review Papers' contributions to the discipline of ecology. The Peer-review Assignment will provide students with the opportunity to learn to articulate their assessment of a peer's work in a constructive manner, as in the formal process of professional scientific peer-review. Peer-review Assignments will be assessed based on those criteria. Guidance on how to conduct peer reviews will be posted on BB; additional information can be found here: http://www.esapubs.org/esapubs/reviewers.htm. ***Peer reviews will be due on May 6.*** Assignments may be turned in by email or hardcopy.

Grading Scale (% of available points)

Letter grades will be determined by the standard scale A: 90%; B: 80%; C: 70%, etc, with each letter grade divided in thirds to determine +/- divisions.

Disability Assistance

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Other useful texts:

Brown, James. H. and Geoffrey B. West. 2000. Scaling in Biology. Oxford University Press.
Case, Ted J. 2000. An illustrated guide to theoretical ecology. Oxford University Press.
Chase, Jonathan M. and Mathew A. Liebold. 2003. Ecological Niches: Linking classical and contemporary approaches. University of Chicago Press.
Cody, Martin L. and Jared M. Diamond. 1975. Ecology and evolution of communities. Belknap Press.
Diamond, Jared and Case, Ted J. 1986. Community ecology, Harper & Row.
Dodds, W. 2009. Laws, Theories, and Patterns in Ecology. University of California Press, Berkeley, CA
Gotelli, Nicholas J. 2001. A Primer of Ecology, 3rd ed, Sinauer Press.
Gotelli, Nicholas J. and Aaron M. Ellison. 2004. A Primer of Ecological Statistics. Sinauer Press.
Grace, James B. and David Tilman. 1990. Perspectives on plant competition. Academic Press.
Holyoak, Marcel, Mathew A. Leibold, and Robert D. Holt. 2005. Metacommunities : spatial dynamics and ecological communities, University of Chicago Press.
Hubbell, Stephen. 2001. The Unified Neutral Theory of Biodiversity and Biogeography. Princeton University Press.
Huston, Michael A. 1994. Biological Diversity. Cambridge University Press.
Kinzig, A. P., S. W. Pacala, and D. Tilman. 2001. The Functional Consequences of Biodiversity: Empirical Progress and Theoretical Extensions. Princeton University Press.
Lincoln, R., G. Boxshall, and P. Clark. 1998. A Dictionary of Ecology, Evolution, and Systematics. Oxford University Press.
Losos, J.B. 2011. Lizards in an Evolutionary Tree: Ecology and Adaptive Radiation of Anoles. University of California Press, Berkeley, CA
Losos, J.B., R.E. Ricklefs (eds) 2009. The Theory of Island Biogeography Revisited. Princeton University Press, Princeton, NJ
MacArthur, Robert H. and Edward O. Wilson. 1967. The theory of island biogeography, Princeton University Press.
Magurran, A. E. 2004. Measuring Biological Diversity. Blackwell Science, Inc.
Resetarits, W. J., Jr. and Bernardo. 1998. Experimental Ecology: Issues and Perspectives. Oxford University Press.
Ricklefs, R.E. and Dolph Shluter. 1993. Species Diversity in Ecological Communities. University of Chicago Press.
Rosenzweig, Michael L. 1995. Species Diversity in Space and Time. Cambridge University Press.
Scheiner, S. M. and J. Gurevitch. 1993. Design and Analysis of Ecological Experiments. 1 edition. Chapman and Hall.
vanStraalen, N.M., D. Roelofs. 2006. An Introduction to Ecological Genomics. Oxford University Press, Oxford, England
Strong, Donald R. *et al.* 1984. Ecological communities: conceptual issues and the evidence. Princeton University Press.
Tilman D (1982) Resource competition and community structure. Princeton University Press, Princeton, N.J.
Tilman D (1988) Plant strategies and the dynamics and structure of plant communities. Princeton University Press, Princeton, N.J.
Verhoef, H.A., P.J. Morin (eds). 2010. Community Ecology: Processes, Models, and Applications. Oxford University Press, Oxford, England.