BIOL 5961 Graduate Seminar in Ecology & Sustainability

I. General Information

Professor: Dr. Kenneth Schoenly
Office: N271
Phone: 667-3949
Off. Hrs: MW: 9-10:30 or by appointment

Semester: Spring 2017
Credits: 1 unit
Class: W 11:15-12:15 (N210)
Email: kschoenly@csustan.edu

II. Course and Topic Description

(Catalog Description) **(1 unit)** Seminar-format couse in which each student presents information and leads discussion on topic selected fro the semester. Topics change each semester. Each student is required to take the course three times. Prerequisites: Graduate standing in the Ecology and Sustainability master's program or consent of instructor. (Fall, Spring).

Topic: Foundational and Applied Papers in Community and Ecosystem Ecology

Ecology is an *experimental*, *observational*, *mathematical* and *correlative* science. The origins of ecology as a scientific discipline began with the application of experimental and quantitative methods to the analysis of organism-environment relations, community structure and succession, and population dynamics (Kingsland 1991). We will read, discuss, and critique both foundational and applied papers, sourced from the refereed literature, in the areas of community and ecosystem ecology. For each paper we read and discuss, think about how you can apply concepts or methods to your graduate thesis.

There is no textbook for this course. Instead, we will read primary literature, both science citation classics and more recent application papers of these classics. All papers are posted as PDF files on Blackboard. Give yourself a few days to download and read (and re-read, if necessary!) each paper so you are both familiar and confident with the paper's aims, content, methods, analyses, and conclusions.

III. Learning Objectives

1. The student will be able to summarize broad ecological concepts discussed in class through reading and critiquing peer-reviewed papers in the ecological literature, focusing on its hypothesis-driven features.

2. The student will be able to provide specific examples of ecological questions and methods researchers have used to answer those questions in the areas of community and ecosystem ecology.

3. The student will be able to cite published evidence to inform their scientific positions on questions addressed in the assigned papers.

4. The student will extend what is gained from reading foundational and recent application-based papers to their particular thesis topic in the Ecology & Sustainability master's program.

IV. Course Requirements and Teaching Philosophy

This course **demands punctuality and regular attendance, and commitment and concentration** to the course readings. As per university regulations, students with do not attend the first class (without 24-hr prior or subsequent notice) will be dropped.

As a graduate student enrolled in the E&S M.S. program, the faculty expect that you will perform at a higher level than undergraduates. This means making the most of the many opportunities that graduate work provides. If you are taking a biology course, this is a period in which you should become fully immersed in biology, to live and breathe science, and to experience a growing professional awareness and confidence. It affords you the opportunity to take an active role in shaping your future professional life and make contributions in your chosen field of study.
To maximize these benefits, both you and the university must make commitments. The university must make available the resources, both intellectual and physical, that are necessary for you to complete coursework, pursue your program of studies, and realize your potential. For your part, you must take advantage of the many opportunities in the department by being highly motivated and focused in the first place, and by directing that motivation in a productive manner. If you proceed appropriately, the assignments in this course and others should become guidelines and exciting challenges rather than hurdles and hindrances.

For your convenience, the syllabus, readings, and handouts for this class are posted online using Blackboard. Find the Spring 2017 Blackboard courses to access your courses and materials.

V. Class Participation and Personal Responsibility

You should arrive to class on time and be ready to learn. You will take frequently (weekly) in small groups, and present your interpretations and ideas to the entire class. Be honest and hold yourself accountable for your actions. **At the start of class, turn off cell phones. Check your university email daily for updates of information items.** Your work should reflect your own effort and words. Cheating in any form, including plagiarism, is inappropriate and will be unpleasant for all involved, so just don't do it.

VI. Math

Every biologist uses math, especially statistics, but this is particularly the case for ecology. You are likely to encounter some complicated quantitative analyses in the papers you are reading. Although I don't expect you to cite proofs and details of each step in each analysis, you are expected to correctly interpret verbally the results, including tables and figures, and explain why the authors' chose to use the particular procedures they did in the paper. This may require additional reading on your part (via textbooks or authoritative websites) to understand and explain each procedure. Avoiding or glossing over the math betrays the philosophy of our program and the profession. Indeed, you may find that some of the methods you are reading about are applicable to your own thesis topic. So, take the effort – it will pay you dividends many times over!

VII. Assignments and Grading

Although there are no exams, each student will lead the discussion on two unrelated papers assigned at random. Each topic below includes a pair of related papers, one a citation classic and the other a more recent application.

For **students leading the discussion**, you will prepare **two typed copies of a brief summary** of the article's content (1 page, front and back), one for me and the other for you to use during class (hand it to me at the start of class). Be prepared to present a 20-min. oral critique (i.e., PowerPoint presentation with tables & graphs from paper) and become familiar with the topic to facilitate 30-40 min. of discussion and questions. This may require you to read other papers cited or not cited in the concept or applications paper. Your work needs to reflect your own effort and words (NOTE: 'copying and pasting' sentences from the paper is a form of plagiarism!).

For **students not leading discussions**, you will prepare **two typed copies of a one-page paper summary**, one for me to grade and the other for you to use as reference during the discussion session. I will provide a "paper summary template" file for you to use as a guide. While it is no substitute for a thorough vetting of the article, the summary template may also serve students who are leading discussions. Again, your work needs to reflect your own effort and words.

Attendance and participation are critical components of building critical understanding and expertise of ecological concepts and applications that come with earning a graduate degree. In addition, correct spelling and grammar are all necessary for succeeding in a professional career. Because we will meet only once each week, we will only scratch the surface with few chances to reinforce and build on these concepts and applications. I expect that everyone will have perfect attendance, but if you miss a class, that absence will be your only **"free pass"**. **If you miss two or more meetings you will receive an F.**

There are a total of 140 possible points that you can earn in this class, up to 10 points each week times 14 weeks (see schedule below). Points are assigned as a function of attendance, participation, and weekly article summaries. In the event you miss (or are unready to present) your scheduled talk, you will receive an automatic `0' for the assignment. No extra credit will be offered beyond points earned on these assignments.

Class Attendance (4 x 14)	56 pts (40%)
Weekly Summary (2 x 14)	28 pts (20%)
Active Participation & Discussion (4 x 14)	56 pts (40%)
Total	140 pts (100%)

A = 126-140, B = 112-125, C = 98-111, D = 84-110, F < 84 points. No +/- grading will be used.

VIII. Recording Policy

Audio or video recording of classes (tape and digital format) is not permitted under any circumstances. If you do not intend to comply with this policy, please discuss this with the instructor or take another class. An exception is made for students registered with Disability Resource Services, who are approved for this accommodation. In such exceptions, DRS students will be asked to sign a "Recording Agreement" which disallows them from sharing recordings with other individuals unless approved by the DRS program.

IX. Getting Help & Study Skills

Some suggestions that may help you succeed in this seminar include: a) do not wait until the day of class to start your assignment. You may underestimate the time to assimilate the paper's content and this will reveal itself during the discussion period and on your summary form; b) make sure you are fully rested, so go to bed early the night before and get up early the day of your presentation; and c) learn how you learn and then stay with a style or process that helps you succeed.

X. Some Important Dates:

January 26: First class day
February 22: Census date: Last day to add/drop
March 20-24: Spring Break (No Classes)
March 31: Cesar Chavez Day (No Class)
April 22 (Sat): Earth Day!
May 12 (F): Warrior Day (No lecture or lab class)
May 17: Last day of classes

TOPIC SCHEDULE AND READINGS*

Date	Number & Topic	Read (before class)
Feb 1	Course Introduction, Science Makes Me Feel Stupid, Pragmatic Advice to Graduate Students	Witz, B. 1994. Some pragmatic advice to graduate students: a hybridization of Stearns, Huey, and Binkley. *Bull. Ecol. Soc. Am*. 176-177. Schwartz, M. 2008. The importance of stupidity in scientific research. *J. Cell Science* 121: 1771.
Feb 8	#1: Methodological Advances: Pseudoreplication (classic paper)	Hurlbert, S. 1984. Pseudoreplication and the design of ecological field experiments. *Ecol. Monogr*. 54: 187-211.
Feb 15	#2: Methodological Advances: Pseudoreplication (recent paper & application)	Schank, J. & T. Koehnle. 2009. Pseudoreplication is a pseudoproblem. *J. Comp. Psych*. 123: 421-433.
Feb 22	#3: Methodological Advances: Rarefaction (classic paper)	Tipper, J. 1979. Rarefaction and rarefiction: the use and abuse of a method in paleoecology. *Paleobiology* 5: 423-434.
Mar 1	#4: Methodological Advances: Rarefaction (recent paper & application)	Gotelli, N. and R. Colwell. 2001. Quantifying biodiversity: procedures and pitfalls in the measure-ment and comparison of species richness. *Ecology Letters* 4: 379-391.
Mar 8	#5: Ecological Succession (classic paper)	Connell, J. & R. Slatyer. 1977. Mechanisms of succession in natural communities and their role in community stability and organization. *Am. Nat*. 111: 1119-1144.
Mar 15	#6: Ecological Succession (recent paper & application)	Michaud, J-P et al. 2015. Rewriting ecological succession history: did carrion ecologists get their first? *Quart. Rev. Biol*. 90: 45-66.
Mar 22	Spring Break, No Class	
Mar 29	#7: Food Webs & Keystone Species (classic paper)	Paine, R. 1966. Food web complexity and species diversity. *Am. Nat*. 100: 65-75.
Apr 5	#8: Food Webs & Keystone Species (recent paper & application)	Power, M. et al. 1996. Challenges in the quest for keystones. *BioScience* 46: 609-620.
Apr 12	#9: Island Biogeography (classic paper)	Simberloff, D. & E. Wilson. 1969. Experimental zoogeography of islands: the colonization of empty islands. *Ecology* 50: 278-296.
Apr 19	#10: Island Biogeography & Habitat Fragmentation (recent paper & application)	Laurance, W. 2008. Theory meets reality: How habitat fragmentation research has transcended island biogeographic theory. *Biol. Conserv*. 1731-1744.
Apr 26	#11: Multivariate Approaches & Community Structure (classic paper)	Bray, J. & J. Curtis. 1957. An ordination of the upland forest communities of southern Wisconsin. *Ecol. Monogr*. 325-349
May 3	#12: Multivariate Approaches & Community Structure (recent paper & application)	Wright, I. & M. Ryan. 2016. Impact of mining and industrial pollution on stream macroinvertebrates: importance of taxonomic resolution, water geochemistry and EPT indices for impact detection. *Hydrobiologia* 772: 103-115.
May 10	Wrap Up and Review	Sand-Jensen, K. 2007. How to write consistently boring scientific literature. *Oikos* 116: 723-727.

*Topic content and dates of coverage in the syllabus may be changed due to extenuating circumstances.