UNIVERSITY OF CALIFORNIA, MERCED
ES / QSB 248: Advanced Topics in Ecology (3 units) – Syllabus
Spring 2017

Class Meeting Time: Tuesdays and Thursdays, 12:00 - 01:15 pm
Location: Classroom Bldg. 205

Instructor: Professor Stephen C. Hart (shart4@ucmerced.edu)
Science and Engineering Bldg., Rm. 204; Office Phone: 228-4656
Office hours: Tuesdays and Thursdays: 01:30 – 02:30 pm, or by appointment

I. Course Description

Course utilizes directed readings and discussion of classical and current literature in ecology, including physiological, population, community, ecosystem, landscape, and global ecology studies. Students are expected to have completed a college-level, introductory course in ecology before taking this course. *Normal Letter Grade only.*

II. Course Goals and Outcomes:

a. ***Course Goals:***

- Critically read and discuss both classical ecological studies and contemporary hot topics in ecology
- Develop an appreciation of how classical ecological studies have influenced current ecological thinking
- Comprehend how paradigm shifts in ecology occur, and whether there are common features that can be applied to the design and analysis of future studies
- Develop the skills for writing a publication-quality review on an ecological topic in need of synthesis
- Improve oral communication skills when discussing scientific concepts

b. ***Learning Outcomes:*** At the end of the course, students should be able to:

- Name the researcher(s), cite the publication, and explain the general objectives/hypotheses and conclusions in several classical and contemporary papers in ecology. Clearly articulate the contributions of these studies to the advancement of the field of ecology.
- Identify a topic in need of synthesis in ecology, conduct a thorough literature search, synthesize the information, and write a publication-quality manuscript on an ecological topic of interest.
- Communicate orally about complex ecological information with clarity of thought and be able to support and defend positions on concepts, methods, interpretations, and inferences made in ecological studies.

c. Format and Procedures:

Each class period, we will discuss approximately three to four "thematic" papers. During the first half of the course, the instructor will select the classic papers to be discussed from the required textbook or from the primary literature. During the second half of the course, the students will select their own papers to be discussed from contemporary

studies within various ecological subdisciplines that are considered to be "hot" (influential) by the scientific community.

Students will be required to have read the papers thoroughly before each class. One student will be in charge of leading the discussion of the papers for each class period, and that individual will need to have a strong enough understanding of the papers to facilitate a lively discussion among the class participants. Facilitators are encouraged to meet with the instructor to discuss the readings prior to their assigned week. Each student will be required to facilitate two or more class periods depending on course enrollments.

By the second week of the course, students will need to have selected a topic for their review/synthesis paper; the instructor must approve all topics. Scheduling of the oral presentations will be made near the end of the semester. See the detailed schedule below for important assignment due dates.

III. Course Requirements & Grading Procedures:

a. ***Class Attendance and Participation Policy***:
Given that this course is based on discussion, attendance is mandatory. Missing more than three classes during the semester without a written medical excuse or without prior instructor approval will result in a decrease in one letter grade for the course. If more than six classes are missed, the student's grade will be lowered by two letter grades. A student that misses more than nine classes will be given a grade of "F."

Class participation accounts for 30% of the student's final grade in the course. Participation will be evaluated by: 1) how well the student directs the discussion when they are presenting a paper to the class; and 2) the quality of the comments and questions posed to the discussion leader and other discussion participants when the student is not leading the discussion (i.e., comments that clearly indicate that the student has read the papers and prepared for the discussion).

b. ***Required and Supplemental Readings*:**
Required Textbook:

Real, Leslie A. and James H. Brown (Eds.). 1991. Foundations of Ecology: Classic Papers with Commentaries. Univ. of Chicago Press, Chicago, USA. 920 p. ISBN-10: 0226705943, ISBN-13: 978-0226705941

Additional readings from the primary literature will be required.

c. Course Assignments and Projects:

Late assignments (e.g., review/synthesis paper) will not be accepted.

The student's final grade in this course will be based on their combined performance in three separate areas: class participation, which includes leading at least two class discussions (the exact number depends on the size of the class), a review/synthesis paper, and a class presentation that summarizes the topic covered in the paper. Exactly how the

student leads a class discussion is up to him or her; however, the discussion leader is expected to engage the rest of the class in the topic. The review/synthesis paper can be on any topic in the field of ecology, but it must be synthetic and not just a rehashing of previous work. For example, the "***Concepts & Synthesis***" type of manuscript for the journal Ecology states: "The Concepts and Synthesis section publishes papers that conceptually advance the field of ecology, including reviews that lead to a more synthetic overview of a subfield. These papers are expected to go well beyond works being reviewed and include discussion of new directions, new syntheses, and resolutions of old questions." The *target* length for the review/synthesis paper should be 20-30 manuscript pages (double-spaced, 12-point font Times New Roman font, including **everything** from Title Page through the last figure). Format of these papers should follow the instructions to authors for review or synthesis paper publication in any appropriate journal in the field of ecology including, but not limited to, the following journals:

- *Ecology*

Concepts and Synthesis or **Perspectives** manuscript types
http://esapubs.org/esapubs/journals/ecology.htm

- *Frontiers in Ecology and the Environment*

http://www.esajournals.org/loi/fron

- *Journal of Ecology*

http://www.journalofecology.org/view/0/authorGuideline.html#typesofpaperpublished

- *Trends in Ecology and Evolution*

https://www.journals.elsevier.com/trends-in-ecology-and-evolution/

It is not required that you attempt to publish your class paper. However, the instructor will help/encourage those students that produce exceptional manuscripts to submit their class papers for possible publication in these or other journals (several students taking similar classes from the instructor have successfully published their class papers in the past).

Class presentations should last about 25-30 minutes. This presentation should be of the same quality as would be expected at a professional seminar or meeting. The instructor and class (peers) will evaluate the quality of the presentation and provide constructive comments (anonymously in the case of peers).

d. ***Grading***:

Class Participation:	30%
Review/Synthesis paper (*Including meeting milestones satisfactorily and on time*):	50%
Class Presentation (*Including quality of peer reviews*)	20%

Your final grade will be based on a total of 1000 points: class participation (300 points), review/synthesis paper (500 points), and class presentation (200 points). Grades will be

given using the approximate framework: A: 90 - 100%, B: 80 - 90%, C: 70 - 80%, D: 60 - 70%, F < 60%.

IV. Academic Integrity

The following is a generic commentary on Academic Integrity. Not all of these points are applicable to this course.

Academic integrity is the foundation of an academic community and without it none of the educational or research goals of the university can be achieved. All members of the university community are responsible for its academic integrity. Existing policies forbid cheating on examinations, plagiarism and other forms of academic dishonesty.

a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy (http://studentconduct.ucmerced.edu/sites/studentconduct.ucmerced.edu/files/page/documents/academic_honesty_-_800.pdf). Any work submitted by a student in this course for academic credit will be the student's own work.

b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.

c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

d. Examples of academic dishonesty include:

- receiving or providing unauthorized assistance on examinations
- using unauthorized materials during an examination
- plagiarism - using materials from sources without citations
- altering an exam and submitting it for re-grading
- fabricating data or references
- using false excuses to obtain extensions of time or to skip coursework

e. The ultimate success of a code of academic conduct depends largely on the degree to which the students fulfill their responsibilities towards academic integrity. These responsibilities include:

- Be honest at all times.
- Act fairly toward others. For example, do not disrupt or seek an unfair advantage over others by cheating, or by talking or allowing eyes to wander

during exams.

- Take group as well as individual responsibility for honorable behavior. Collectively, as well as individually, make every effort to prevent and avoid academic misconduct, and report acts of misconduct, which you witness.
- Do not submit the same work in more than one class. Unless otherwise specified by the instructor, all work submitted to fulfill course requirements must be work done by the student specifically for that course. This means that work submitted for one course cannot be used to satisfy requirements of another course unless the student obtains permission from the instructor.
- Unless permitted by the instructor, do not work with others on graded coursework, including in class and take-home tests, papers, or homework assignments. When an instructor specifically informs students that they may collaborate on work required for a course, the extent of the collaboration must not exceed the limits set by the instructor.
- Know what plagiarism is and take steps to avoid it. When using the words or ideas of another, even if paraphrased in your own words, you must cite your source. Students who are confused about whether a particular act constitutes plagiarism should consult the instructor who gave the assignment.
- Know the rules --- ignorance is no defense. Those who violate campus rules regarding academic misconduct are subject to disciplinary sanctions, including suspension and dismissal.

Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

The instructor will make every effort to accommodate all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please speak with the instructor during the first week of class regarding any potential academic adjustments or accommodations that may arise due to religious beliefs during this term.

Tentative Course Schedule: Please note that the instructor reserves the right to change the schedule. You will be advised in advance of any changes.

Week 1: Jan. 17: **Course Overview**

Assigned reading (Instructor led):

Belovsky et al. 2004. Ten Suggestions to Strengthen the Science of Ecology. BioScience 54:345-351.

Scheiner, S.M., and M.R. Willig. 2008. A general theory of ecology. Theoretical Ecology 1: 21-28.

McIntosh, R.P. 1989. Citation classics in ecology. *Quarterly Review of Biology* 64: 31-49.

Pauly D., and K. Stergiou. 2005. Equivalence of results from two citation analyses: Thomson ISI's Citation Index and Google's Scholar service. *Ethics in Science and Environmental Politics* 2005: 33-35.

Jan. 19: **How to Write a Review Paper**

Assigned reading (Instructor led):

Moore, C.M., and M. Forister. 2009. Let's Give Them Something to Talk About: Choosing a Discussion Paper. Frontiers in Ecology and the Environment 7: 501–502

Day, R.A., and B. Gastel. 2011. How to write a review paper. Pp. 147-151 *in* How to Write and Publish a Scientific Paper, 7th Ed., ABC-CLIO, LLLC, Santa Barbara, CA. 300 p.

Hofmann, A.H. 2014. Review articles. Pp. *in* 359-375, Scientific Writing and Communication: Papers, Proposals, and Presentations, 2ND Ed., Oxford University Press, New York. 728 p.

Week 2: Jan. 24: **Foundation Papers (Real and Brown 1991)**

Discussion Leader: TBD

Defining Ecology as a Science
Sharon E. Kingsland

Henry Chandler Cowles (1899) The Ecological Relations of the Vegetation on the Sand Dunes of Lake Michigan. The Botanical Gazette 27: 97-117, 167-202, 281-308, 361-91

Frederic E. Clements (1936) Nature and Structure of the Climax. The Journal of Ecology 24: 252-84

Jan. 26: **Foundation Papers (cont.)**

Discussion Leader: TBD

H. A. Gleason (1926) The Individualistic Concept of the Plant Association. Bulletin of the Torrey Botanical Club 53: 7-26

Joseph Grinnell (1917) The Niche-Relationships of the California Thrasher. The Auk 34: 427-33

Raymond L. Lindeman (1942) The Trophic-Dynamic Aspect of Ecology. Ecology 23: 399-418

Prospectus for review/synthesis paper due

Week 3: Jan. 31: **Theoretical Advances (Real and Brown 1991)**

Discussion Leader: TBD

The Role of Theory in the Rise of Modern Ecology
Leslie A. Real and Simon A. Levin

F. W. Preston (1962) The Canonical Distribution of Commonness and Rarity, Part I. Ecology 43: 185-215, 413-32

G. Evelyn Hutchinson (1957) Concluding Remarks. Population Studies: Animal Ecology and Demography. Cold Spring Harbor Symposia on Quantitative Biology 22: 415-27

Feb 02: **Theoretical Advances (cont.)**

Discussion Leader: TBD

Lamont C. Cole (1954) The population Consequences of Life History Phenomena. The Quarterly Review of Biology 29: 103-37

Robert M. May (1974) Biological Populations with Non-Overlapping Generations: Stable Points, Stable Cycles, and Chaos. Science 186: 645-47

Week 4: Feb. 07: **Theoretical Advances (cont.)**

Discussion Leader: TBD

Robert H. MacArthur and Eric R. Pianka (1966) On Optimal Use of a Patchy Environment. The American Naturalist 100: 603-9

Vito Volterra (1926) Fluctuations in the Abundance of a Species Considered Mathematically. Nature 118: 558-60

Feb. 09: **Theses, Antitheses, and Syntheses (Real and Brown 1991)**

Discussion Leader: TBD

Conversational Biology and Ecological Debate
Joel G. Kingsolver and Robert T. Paine

A. G. Tansley (1935) The Use and Abuse of Vegetational Concepts and Terms. Ecology 16: 284-307

G. E. Hutchinson (1959) Homage to Santa Rosalia; or, Why Are There So Many Kinds of Animals? The American Naturalist 93: 145-59

Draft Outline for review/synthesis paper due

Week 5: Feb. 14: **Theses, Antitheses, and Syntheses (cont.)**

Discussion Leader: TBD

Nelson G. Hairston, Frederick E. Smith, and Lawrence B. Slobodkin (1960) Community Structure, Population Control, and Competition. The American Naturalist 94: 421-25

Paul R. Ehrlich and Peter H. Raven (1964) Butterflies and Plants: A Study in Coevolution. Evolution 18: 586-608

Feb. 16: **Theses, Antitheses, and Syntheses (cont.)**

Discussion Leader: TBD

J. L. Harper (1967) A Darwinian Approach to Plant Ecology. The Journal of Ecology 55: 247-70

Thomas W. Schoener (1971) Theory of Feeding Strategies. Annual Review of Ecology and Systematics 2: 369-404

Week 6: Feb. 21: **Methodological Advances (Real and Brown 1991)**

Discussion Leader: TBD

New Approaches and Methods in Ecology
James H. Brown

Lennart von Post (1967 [1916]) Forest Tree Pollen in South Swedish Peat Bog Deposits. Pollen et Spores 9: 378-401. A translation by Margaret Bryan Davis and Knut Faegri of Om skogstradspollen i sydsvenska torfmosselagerfolijder (foredragsreferat) (Geolgiska Foereningen i Stockholm. Foerhandlingar 38: 384-34), with an introduction by Knut Faegri and Johs. Iversen

P. H. Leslie (1945) On the Use of Matrices in Certain Population Mathematics Biometrika 33: 183-212

L. C. Birch (1948) The Intrinsic Rate of Natural Increase of an Insect Population. The Journal of Animal Ecology 17: 15-26

Feb. 23: **Methodological Advances (cont.)**

Discussion Leader: TBD

C. S. Holling (1959) The Components of Predation as Revealed by a Study of Small Mammal Predation of the European Pine Sawfly. The Canadian Entomologist 91: 293-320

Warren P. Porter and David M. Gates (1969) Thermodynamic Equilibria of Animals with Environment. Ecological Monographs 39: 227-44

Final Outline for review/synthesis paper due including References

Week 7: Feb. 28: **Methodological Advances (cont.)**

Discussion Leader: TBD

J. Roger Bray and J. T. Curtis (1957) An Ordination of the Upland Forest Communities of Southern Wisconsin. Ecological Monographs 27: 325-49

Eugene P. Odum (1969) The Strategy of Ecosystem Development. Science 164: 262-70

Mar. 02: **Case Studies in Natural Systems (Real and Brown 1991)**

Discussion Leader: TBD

Lessons from Nature: Case Studies in Natural Systems
Robert K. Peet

J. Davidson and H. G. Andrewartha (1948) The Influence of Rainfall, Evaporation and Atmospheric Temperature on Fluctuations in the Size of a Natural Population of Thrips *Imaginis* (Thysanoptera). The Journal of Animal Ecology 17: 200-222

John M. Teal (1962) Energy Flow in the Salt Marsh Ecosystem of Georgia. Ecology 43: 614-24

Week 8: Mar. 07: **Case Studies in Natural Systems (cont.)**

Discussion Leader: TBD

Margaret B. Davis (1969) Climatic Changes in Southern Connecticut Recorded by Pollen Deposition at Rogers Lake. Ecology 50: 409-22

Alex S. Watt (1947) Pattern and Process in the Plant Community. The Journal of Ecology 35: 1-22 Mar 09: **Case Studies in Natural Systems (cont.)**

Discussion Leader: TBD

Robert H. MacArthur (1958) Population Ecology of Some Warblers of Northeastern Coniferous Forests. Ecology 39: 599-619

John Langdon Brooks and Stanley I. Dodson (1965) Predation, Body Size, and Composition of Plankton. Science 150: 28-35

Week 9: Mar. 14: **Experimental Manipulations in the Laboratory and Field Systems (Real and Brown 1991)**

Discussion Leader: TBD

Manipulative Experiments as Tests of Ecological Theory
Jane Lubchenco and Leslie A. Real

H. B. D. Kettlewell (1955) Selection Experiments on Industrial Melanism in the Lepidoptera. Heredity 9: 323-42

Thomas Park (1948) Experimental Studies of Interspecies Competition. I. Competition between Populations of the Flour Beetles, Tribolium *confusum* Duvall and *Tribolium castaneum* Herbst. Ecological Monographs 18: 267-307

C. B. Huffaker (1958) Experimental Studies on Predation: Dispersion Factors and Predator-Prey Oscillations. Hilgardia 27: 343-83

Mar. 16: **Experimental Manipulations in the Laboratory and Field Systems (cont.)**

Discussion Leader: TBD

Joseph H. Connell (1961) The Influence of Interspecific Competition and Other Factors on the Distribution of the Barnacle *Chthamalus stellatus*. Ecology 42: 710-23

Robert T. Paine (1966) Food Web Complexity and Species Diversity. The American Naturalist 100: 65-75

Week 10: Mar. 21: **Experimental Manipulations in the Laboratory and Field Systems (cont.)**

Discussion Leader: TBD

Daniel S. Simberloff and Edward O. Wilson (1969) Experimental Zoogeography of Islands: The Colonization of Empty Islands. Ecology 50: 278-96

Gene E. Likens, F. Herbert Bormann, Noye M. Johnson, D. W. Fisher, and Robert S. Pierce (1970) Effects of Forest Cutting and Herbicide Treatment on Nutrient Budgets in the Hubbard Brook Watershed-Ecosystem. Ecological Monographs 40: 23-47

Mar. 23: **How to Present a Paper Orally**

Day, R.A., and B. Gastel. 2011. How to present a paper orally. Pp. 173-178 *in* How to Write and Publish a Scientific Paper, 7th Ed., ABC-CLIO, LLLC, Santa Barbara, CA. 300 p.

Hofmann, A.H. 2014. Oral presentations. Pp. *in* 542-574, Scientific Writing and Communication: Papers, Proposals, and Presentations, 2ND Ed., Oxford University Press, New York. 728 p.

Larkin, M. 2015. How to give a dynamic scientific presentation, elsevier.com/connect/how-to-give-a-dynamic-scientific-presentation. Posted on 4 August 2015.

Video (uploaded to CatCourses) by Susan McConnell (Stanford University): Designing Effective Scientific Presentations

Week 11: Mar. 28: *Spring Break*, **NO CLASS**

Mar. 30: *Spring Break*, **NO CLASS**

Week 12: Apr. 04: **Hot Topics in Physiological Ecology ***
Discussion Leader: TBD

Apr. 06: **Hot Topics in Population Ecology***
Discussion Leader: TBD

Week 13: Apr. 11: **Hot Topics in Community Ecology***
Discussion Leader: TBD

Apr. 13: **Hot Topics in Landscape Ecology***
Discussion Leader: TBD

Week 14: Apr. 18: **Hot Topics in Global Ecology***
Discussion Leader: TBD

Apr. 20: **Hot Topics in Ecosystem Ecology***
Discussion Leader: TBD

Draft Version Review/Synthesis Paper due; Instructor comments returned by April 25th

Week 15: Apr. 25: ***Student Oral Presentations:***
Apr. 27: ***Student Oral Presentations (cont.):***

Week 16: May 02: ***Student Oral Presentations (cont.):***
May 04: ***Student Oral Presentations (cont.):***

Final Version Review/Synthesis Paper Due May 05 at 5 pm (please provide instructor with a hard copy); NO FINAL EXAM

* Reading list to be determined by discussion leader for that class period. Check UCM CatCourses within the dated folder for assigned readings.