ECL 216 CRN #75472
Ecology and Agriculture

Winter Quarter 2018
Instructors: Neal M Williams-Amélie Gaudin

Thursday 1-4PM
Bowley Conference Room (105 Bowley Science Center)
Units: 4

Overview

This course will examine how ecological principles and linkages across scales are expressed in agroecosystems and explore how ecological approaches can be applied to the development of sustainable management for agriculture. We will dissect processes at the organism (autoecology/crop ecophysiology), population, community, ecosystem, and landscape level in agricultural settings, and explore how stakeholder involvement and decisions shape ecological processes and the environmental and productivity outcome of agriculture. The class will be organized as a series of lectures with student led discussion, three group mini-projects and a term paper.

Course Schedule and Mechanistics

Each class meeting block will consist of:

- A lecture (30 to 50 min),
- A student led discussion of one to two research papers (1-2hs).
- A short introduction to the following week topic to clarify the concepts and vocabulary you will encounter in your reading assignments (30 min).
- There will be two-three class exercises (sometimes in the field) followed by a discussion relevant to the papers and scale appraised that week.

Week	Instructor	Date	Subject	Assignments
1	AG/NW	11-Jan	Class introduction Agricultural Ecology: Scales and Scope Intro to autoecology and root ecophysiology	Class exercise in the market garden (not graded)
2	AG	18-Jan	Autecology: Ecophysiology of Crops and Their Wild Relatives Intro to community ecology	Class exercise, lab (graded)
3	NW	25-jan	Community Ecology I: Multitrophic interactions and biological control	Class exercise (not graded)

4	AG	1-Feb	Community Ecology II: soil communities-plants symbiosis. Intro to Carbon fluxes in ecosystems	
5	A.Kendall	8-Feb	Ecosystems Ecology I: life cycle analysis and carbon fluxes in/out of agroecosystems Intro to integrated and diversified ecosystems	
6	AG	15-Feb	Ecosystems Ecology II: Integrated systems Intro to landscape ecology	
7	NW	22-Feb	Landscape Ecology I: Resource concentration-heterogeneity (qGIS). Intro to biodiversity and ecosystem functioning	Class exercise (graded)
8	NW	1-Mar	Landscape Ecology II: Biodiversity and functioning - pollinator	
9	NW-AG	8-Mar	Peer review of term paper draft	
10	TBA	15-Mar	Linking Agricultural Ecology with Policy	Case study/ Group discussion
11		22-Mar	Term paper due	

As part of this course you are required to:

a. Lead one discussion session (group of 2): 1) provide 1 to 2 papers and 3-4 study questions to instructors by Friday prior to your session (see scheduling matrix), 2) prepare and present a synthesis of some part of the weekly topics, and 3) lead the paper discussion during class time.
b. Attend class, read papers and answer study questions by 10 am on Wednesdays
c. Complete your term paper and other graded class assignments on time

Paper selection:

You will work as an individual or group of 2. For each topic we have/will provide a starting review or key paper you can choose to use for your discussion or guide you in moving forward in the topic area. Should you choose to do something completely independent please talk with us about it way ahead of time (ideally 1.5 weeks ahead of time). Please reach out to us, we can meet following class the week ahead to discuss plan for the presentation and paper choices (see Matrix).

Study questions:

You will communicate your set of questions associated with the topic and readings to instructors by the Friday before your session to be posted on Canvas. They can be directly about the

content of the paper, or more conceptual about the general topic to discuss. These questions are should be designed to provoke critical thought about the reading, with the goal of reinforcing the most salient topics raised in the paper. Answers to questions are due Wednesday by 10am, so that leaders can reflect on these. We don't expect leaders to build topic around the answers, but it can be very useful to steer discussion. Late answers are not given credit and will affect grade.

How to?

a. Post Questions in "Discussion" with standard label. PLEASE use the format as seen in the example on canvas "Week 0 Study Question 1"

b. Answers to the questions as "Reply". Answers are stamped with your name and date. You cannot read others until you post yours. Feel free to comment on others' responses and add additional materials, links etc.

Assignments and grades (total 100 pts)

All assignments have to be uploaded on canvas by the deadline**.**

- Lead discussion presentation: 10pts
- Participation/study question: 40 pts (8 x 5 pts including completed preclass postings)
- 2 exercise write up: 20pts (2x10 pts)
- Term paper: 30pts (15 pts draft peer evaluation + 15 pts final instructor evaluation)

Discussion presentation (10pts):

You will be assessed by the instructors and your classmates based on 1) the quality of your presentation, discussion points and study questions (5pts), 2) student engagement and communication skills (2 pts) and 3) feedback to students on the pre-class blog (3 pts)

Exercise write up (20 pts):

Another set of assignments for the course consists of 2-page write-ups on the class/field exercises during weeks 2 and 7 and due in class the week after the exercise (due Jan 25th, and March 1st). These short exercises are to familiarize you with the hierarchical category of interest in a specific agricultural context. They should take 1-2 hours to complete.

Term paper (30 pts):

The term paper is your opportunity to find a topic of interest to you, and to use the ecological ideas learned in this class in an agricultural context. Choose a challenge, or problem in modern agriculture. In the paper you will first discuss the nature of the problem. What is it and what are its the implications for crop production, and for functioning ecosystems across spatial and temporal sales? How has it arisen? You will then examine how we, as a community of practice and research, are working to address the challenge going forward. The paper must consider specific ecological processes, and ***show how these processes are important for understanding an agricultural outcome, or for solving an agricultural challenge***. All such

challenges, in their impact and/or potential solutions, have elements from the multiple hierarchical levels we laid out in class (autecology, population ecology, community ecology, ecosystem ecology, or landscape ecology).

In the introduction section you must discuss the challenge/ solutions across scales. In the second section you will need to narrow your topic as you explore it, otherwise it will be so general that it will not be possible to explain ecological relationships. As such you can / should focus on one or just a few examples, discuss specific relationships, discuss methods for approaching the problem and implementing solutions including how information was (or will be) obtained, and why some methods are preferred for certain reasons and circumstances. End the paper with some conclusions about how this ecological information can be used to manage this real-world problem.

Final papers are due by **March 22** The paper must be loaded as an assignment on Canvas website, and will be considered late if it is posted after midnight. The draft paper is due **March 8.** We will use the session on March 8 as a peer review time, thus paper draft should be finished to a quite high-level so that reviewers can provide feedback on content and presentation.

- 9-11 double-spaced pages not including references, tables and figures.
- At least 12 cited references in your paper, and at least half should be research papers (not review articles). Read the research articles in detail to understand methods and interpretations.

Expectations and Administrative notes

You are expected to attend class, upload your take-home exams on time, and be prepared to engage in thoughtful and critical discussion of the material. Whenever we are in the classroom together, everyone is expected to treat one another with courtesy and respect. Each of us brings a unique perspective to the classroom that can enrich the learning experience of everyone. These perspectives will be used for insightful debates rather that stigmatization.

- If you have or suspect you have a learning difference or a disability (physical or learning), work with the Student Disability Center (http://sdc.ucdavis.edu) to arrange accommodations. They will ask for documentation of your disability, and then they will work with you to determine what accommodations you need. Instructors will receive a letter with the accommodations you need. Note: The instructors will not receive information about your disability, which is strictly protected by privacy rules.
- University policy forbids academic dishonesty including copying another student's work, plagiarism in all forms, etc.
- If you have not already done so, please be sure to check your email and Canvas regularly. Important announcements will be communicated via the Canvas class email list.