



Biology 332/333 – Ecology Lecture and Lab (redesign)

Dr. Brynne Bryan – Biology Lecturer

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Course Name & Description: Ecology Lecture and Lab – This is an upper-division biology course with a 3-unit lecture and a 1-unit lab. It is only offered in the Spring.

Project Abstract: There are many small areas on campus that are currently bare or landscaped with high-maintenance water-thirsty plants. These areas could be converted to native plant gardens, and in turn provide living lab space. Native plant gardens on campus will serve the dual purpose of introducing students to ecology and conservation principles that can be passed along to their communities. They will provide Ecology students with research areas for determining the importance of different types of habitat (traditional landscaping, native grassland and coastal sage scrub, and wetlands) for demonstrating the link between native plant diversity and the diversity of native fauna.

GE Credit (if applicable): No

Keywords/Tags: Water-wise native plants; urban coastal sage scrub communities; plant/animal interactions; plant/pollinator interactions; habitat suitability

Instructional Delivery: Lecture – ppts, clicker questions: Lab - Hands-on lab exercises to support concepts learned in lecture

Pedagogical Approaches: [Flipped, Supplemental Instruction, Peer Instruction, Virtual Labs, Clickers, etc.] Team-based learning, applied field-based learning; peer-reviewed experimental design and presentations

Class Size: 24

About the Course Redesign

Stage 1

Background on the Redesign

Why Redesign Your Course?

- **Current Course Description:** (see above)
- Lecture (3:45 hours/week);... I typically lecture using powerpoint slides with few words and mostly images and graphs. I heavily annotate the slides and make them available after the lecture has been given. The lectures involve clicker questions at 15 minute intervals to check that they are getting the concepts. The semester is broken up into three sections, with an exam at the end of each section. Each exam involves one part multiple choice and/or short-answer questions, and one part with several essays. Lectures introduce concepts and definitions,
- Lab (2:45 hours a week): the lab reinforces concepts introduced in lecture with off-campus field trip sites. There are typically three field trips in a semester. The goal is to introduce the students to native habitats within the urban environment, and to teach them methods for quantifying interactions between organisms and their environments. The second half of the semester is devoted to them conducting their own research. The summative result is for them to be able to express their findings in oral and written form.

What type of characteristics are you looking to change in the redesign to incorporate elements of Campus as a Living Lab?

- Lecture: focus more on relevant examples of topics covered that can be found on campus
- Lab: Replace required off-campus field trips with on-campus field trips; foster inquiry into use of on-campus resources for the students' research projects.

Course History/Background

- Describe how this course maps into the selection of courses the students take before and after this particular course in your department or program. Is this course part of a larger selection of sustainability themed curriculum?
 - Ecology is a 300-level class that is an elective for Microbiology and Cellular/Molecular biology majors, but a required class for Ecology majors (as would be expected). The course is available after the students have completed the Principles of Biology series (three semesters), which includes Cell Biology, Diversity of Life, and Evolution/basic ecology. The department is building a stronger sustainability curriculum by modifying existing classes (e.g. Bio122/123 – Diversity of Life, Bio 310/311 – Plant Physiology), but there is no strong sustainability curriculum in place at the moment.
- What is the department's historical context for student success in these courses?
 - As mentioned, sustainability in the curriculum is in the process of being incorporated. Within the context of the classes I teach (GE Biology and the courses mentioned above), I am very passionate about sustainability, and the student success rate of absorbing the information provided is very high.

Course Redesign Planning

Stage 3

Implementing the Redesigned Course

Which Aspects of Your Course Have You Redesigned?

- What are you now doing or planning to do through the redesign of your course? In lecture, I have been planning for some time to move away from lectures and formal exams to team-based learning, with students researching topics in small groups and sharing their findings in front of the class on a regular basis. I want the students to become more active learners, and to break away from their shyness in presenting their discoveries. I want to break away from a heavy reliance on formal exams as assessments, and more towards weekly in-class report-writing that incorporates cumulative knowledge.

In lab, I want to utilize the resources we have available on campus for hands-on application of what they learn in lecture, and for designing and conducting their research projects. In the past I have briefly shown them what we have on campus, but those resources have been ephemeral and subject to change at the whim of decision makers in the upper administration. More recently, we have a strong collaboration with the people in Facilities, and our goals of sustainable landscaping and on-site teaching resources are merging with the Campus as a Living Lab program.

- How has the CALL program influenced the decisions you made in the redesign of your course?
 - Before this grant became available, the small patches of on-campus resources for learning about habitats were not reliable – the goals of the administration for landscaping and the efforts of Facilities for meeting those goals did not align with my goals for using on-campus resources for teaching and for saving money for the department. The CALL grant has been a great incentive for Facilities and instructors such as myself to work together for a common goal – sustainability.

What role did the CALL Champion play in the redesign of your course?

- How was the CALL Champion involved in identifying and developing course content?
 - The original Champion, John Epps, is no longer at this campus. His supervisor, Jonathan Scheffler has been very instrumental in lending support for the installation of the small CALL Garden close to our classrooms, and in making sure this and other native habitat spaces on campus will remain in place and not be replaced with unsustainable landscaping. Other than that, he has not been involved in developing course content.
- How will the CALL Champion participate once the course is redesigned and implemented?

- What are the elements of sustainability currently in the course, if any? How is this content currently delivered?
 - Throughout the semester, in both lecture and lab, I bring up numerous examples of the effects of interactions between organisms and their environment, with repeated emphasis of the consequences of unsustainable human practices. I lecture, and take time to encourage students to discuss these topics.

- Jonathan Scheffler is supportive of maintaining the spaces, communicating issues, and providing replacement materials when needed.

High Demand / Low Success Issues

- Describe the high demand/low success issues which are affecting the course you are redesigning?
 - I get lots of feedback during the semester and at the end of the semester that the students really enjoy the lectures and the lab. The student learning outcomes are relatively high (>95% of the students passing with a C or better). Even though the students enjoy the class, I am not satisfied with the typical performance on exams. I feel that the pressure of exams and the limitations of reading comprehension skills results in poorer performance on the exams that does not necessarily reflect what the students are learning. I do not feel that it is the fault of the questions on the exams (I have made them as simple and straightforward as possible), but the fault lies in the exam-taking process itself. I wish to explore other ways of assessing student retention of information – more in-class writing workshops).

Which Professional Development Activities Have You Participated in During Your Course Redesign?

- Examples: Professional Learning Community (PLC) webinars, technology workshops on campus, conferences, etc.
 - None

(Revised syllabus)

Redesign Results

Stage 4

Course Redesign Impact on Teaching and Learning

Not implemented yet.

(Pre-designed syllabus)

About the Students and Instructor(s)

Stage 2

Student Characteristics

- To the best of your abilities, describe the population of students who take the course, including the range of majors, and their incoming knowledge and/or skills that they typically have coming into the class.
 - Most of the students are first-generation college students. More than half of the students are not Ecology majors. Many of them have at least one job that demands much of their time, and many of them struggle financially. They were introduced to some of the concepts in previous class in the Principles series, but there is little evidence that they retain this information from one semester to the next. Their biggest drawback is the distractions caused by being financially strapped and having to work full-time jobs off-campus. They often postpone buying the textbook until well into the semester. I try to provide inexpensive alternatives to new textbooks.
- Is there an overall sustainability culture with the students at your campus?
 - NO – This is something that I have been struggling to encourage among the students, faculty, and administration for years. The Campus as a Living Lab program has been an incentive for the Facilities staff to become engaged and at least start to embrace sustainability in landscaping.

Advice I Gave My Students to be Successful

- Attendance and punctuality
- Keep up with weekly online quizzes – this is the motivation to study in increments throughout the semester.
- Study two hours for every hour spent in class.
- Make a weekly calendar that includes classes, work, play, family time, and study time.
- Don't read the book from front to back – skim it for terms in bold that they don't know and focus on those first. Look at the figures and figure captions. Skip around. Take the online quiz once, read the chapter thoroughly for answers to questions that were missed, then take the quiz again (two tries).

Impact of Student Learning Outcomes/Objectives (SLOs) on Course Redesign

- The outcomes of this project include: 1) Students will understand the importance of maintaining as much native habitat as possible within the urban environment in order to provide corridors and stepping stones for organisms that struggle to navigate this landscape 2) Students will obtain hands-on practical experience in evaluating species interactions with their environment by utilizing on-campus resources 3) Students will become ambassadors for sustainable practices in their communities, even if they are not ecology majors.
- Current course SLOs:
 - Lecture - Upon completing the course, students should be able to:
 - Understand how the physical environment determines the presence of species
 - Understand potential and constraints on population growth
 - Understand how species interact in terms of competition, predation, and parasitism
 - Understand community succession
 - Understand nutrient and energy cycles on a regional and global scale
 - Lab: Upon completing the course, students should be able to:
 - Use basic ecological field equipment
 - Model population dynamics within and among species using excel.
 - Assess habitat suitability for local species in the field
 - Design a hypothesis-based experiment, with conclusions based on statistical analysis
 - Write in research-article format, with a literature review, methods, results, and conclusions
 - Present research findings in a symposium setting

Alignment of SLOs With Course Redesign

- Briefly describe how the course redesign will align with the SLOs.
 - The pedagogy of the lecture will change from lecture-based to team-based learning. I always try to tie in examples from Southern California to reinforce concepts in the textbook. With the course redesign, I will place more emphasis on examples that can be found on campus.
 - For lab, students will be introduced to resources in the form of native plant communities on campus, and the opportunity to conduct research on campus will be strongly encouraged.

Assessments Used to Assess Students' Achievement of SLOs

- How are you planning to assess the students' achievement regarding the SLOs?
 - The students will be assessed in lecture with the use of mini writing and oral presentation workshops. These workshops will rely on cumulative knowledge as the semester progresses.
 - The assessment in lab will remain the same – team projects in lab, and a written report and oral presentation of the research project at the end of the semester. These assignments will be peer-reviewed at every step of the process.
- Upload a rubric used for redesigned activities (optional).

Accessibility, Affordability, and Diversity Considerations

Accessibility

- Share how you have considered designing the course to serve students with varied abilities.
 - I encourage students to take notes during lecture and connect them with the PowerPoint notes that become available after lecture. Some students come to me and ask if they can record my lectures – I have no problem with them doing this. There is a free software program that allows students to synchronize videos of lectures with their own notes – I make sure that students with various abilities are aware of this app. I also encourage students with concerns, stress, or difficulties taking tests to contact the Students with disabilities and Disabled Student Services where they can have extra time in a quiet space for taking tests.

Affordability

- Are the course materials and technologies used readily available and affordable for your students? Describe the potential cost savings when using more affordable learning materials. To learn more: AL\$, COOL4Ed, or MERLOT
 - I am a strong advocate of affordable learning solutions. Students can buy used books, or they can check out reserved copies from the library. There is no requirement to buy a lab manual – I make materials for each lab available on blackboard. This will not change – I can't make the resources any more affordable than they are, aside from giving the students the opportunity to conduct field research on campus, saving them gas money they would spend driving to off-campus sites.

Diversity

- Do the pedagogical strategies support students' learning with diverse backgrounds?
 - YES

About the Instructor

- Dr. Brynne Bryan
- Please provide a 4-5 sentence description of your professional background and interests, your teaching philosophy.
 - I am an aquatic ecologist, with an expertise in diatom community ecology. I first became interested in aquatic ecology as an undergraduate, when given the independent study project of identifying and photographing everything I could find with a microscope in water samples from a lake near my university. I was hooked. I received my B.S. from Southern Arkansas University, my M.S. at University of North Texas, and my PhD at the University of Puerto Rico. I studied diatoms all along the way.
 - My teaching philosophy is to challenge students to become good critical thinkers, but support them as much as I can to help them succeed in my classes. If I see them struggling with the material, I present the material in a different way.

- Suggestion: Add a CV, a picture, and/or video.

- <https://www.linkedin.com/in/brynne-bryan-093a7126/>



About the Facilities Staff Partner

Jonathan Scheffler
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[Curriculum Vitae](#)

My C.V. with the details of my background and interests:

Course Redesign Teaching and Learning Resources

[CSU Course Redesign Website](#)

Review the description of the CSU system-wide initiative supporting faculty redesigning their courses to improve student success.

[Course Redesign ePortfolio Exemplar](#)

An example of an ePortfolio created by faculty at CSU East Bay to exhibit their course redesign project and their findings.

[MERLOT II's Pedagogy Portal](#)

The MERLOT Pedagogy Portal is designed to help you learn about the variety of instructional strategies and issues that could help you become a better teacher. The resources you'll find in the Pedagogy Portal should apply to teaching a variety of disciplines.

[MERLOT II](#)

MERLOT is a collection of free and open online teaching, learning and faculty development services contributed and used by an international education community. The MERLOT collection of open resources spans across a wide variety of disciplines and education levels. What sets MERLOT apart is a combination of peer reviews, member comments, learning exercises and other valuable information and metadata associated with the materials.