ESRM 200: Principles of Resource Management and Sustainability
Fall 2014

Class Meets: Mon & Wed: 10:00 am-11:50 am
Final Exam: Wed, December 10th 8am
Room: Del Norte 2550
Instructor: Dr. Sean Anderson
Office: 1265 Bell Tower West Office: x 9894 Cell: (805) 732-2732
Office Hours: M 12:00-1:00 pm, T 3:00-4:00 pm (other times can be arranged on request)

Texts:
Lots of additional readings and videos via our CI Learn/eReserves folders.

Podcasts/Videos:
iTunesU TBD
Vimeo http://vimeo.com/user8078769
YouTube https://www.youtube.com/channel/UChWSe6a7wjGeU4e4MDn375A/videos

Information Curation/Sharing Website:
PIRatE Lab’s Sustainability Science Scoop.It Site:
http://www.scoop.it/t/sustainability-science
(Everyone will be added as a curator by Wednesday morning)

COURSE DESCRIPTION
This course will consist of three general sections or units. The first section will focus on the science of sustainability and its implementation locally, regionally, nationally, and globally. Complex topics such as sustainability resist simplistic, reductionist analyses and, instead, require sophisticated, interdisciplinary thinking and creativity. As a result, we will have a variety of visitors/guest speakers this semester who will approach the topic of sustainability from a variety of perspectives. Next, we will cover some traditional natural resource management topics (the historic focus of ESRM 200). The end of the course will consist of small group proposals for projects that will make our CI campus more sustainable and which are implementable here on campus.

COURSE OBJECTIVES
Upon successful completion of this course, students will be able to:
- Demonstrate a working knowledge of the history, principles & philosophy of sustainability & resource management as it is practiced in the U.S. and abroad.
- Develop the ability to analyze practices of sustainability & resource management from an ethical viewpoint
- Distinguish between sustainable practices associated with water usage, energy use, waste streams, & more traditional approaches employed on the CI campus.
- Understand the use of new and traditional approaches to resource management in dealing with external & internal threats to resource conservation and stewardship
- Gain an appreciation for the roles of Non-Governmental Organizations (NGOs), such as the Nature Conservancy and Trout Unlimited and their influence upon resource management.
LEARNING OUTCOMES

Upon completion of this course, students will be able to:
  o Outline a realistic project plan capable of bolstering sustainable practices on the CI campus.
  o Define environmental problems from both environmental science & resource management perspectives.

CLASS FORMAT

Our class will include a variety of pedagogies including lecture, group discussion, panel presentations, and service learning experiences in large and small groups to facilitate student interaction. This interactive style requires students to attend and actively participate in class. As class participation and discussion will be evaluated as part of your final grade, I strongly encourage both your regular attendance and ACTIVE participation.

TESTING AND GRADING

- 1 Midterm Exam 20%
- 1 Final Exam 25%
- In class/field exercises 20%
- Sustainability Project Proposal 25%
- Quizzes 5%
- Participation (including Scoop.It) 5%

SUSTAINABILITY PROJECT PROPOSAL

One central element of our course is your proposal for a practical sustainability project which can be implemented here at CSUCI. You will brainstorm, research, revise, and ultimately professionally pitch your plan to an assembled panel of sustainability experts. This plan will address a particular sustainability issue relevant to our campus. The proposed plan must have a materials and supplies budget of no more than $4,000, be capable of being launched within the first few weeks of the Spring Semester, and be able to be objectively assessed. You and your fellow students will work in small groups (~3 students per group) to prepare a oral presentation and final, complete (written) proposal pitching your project. Each group’s paper will be a minimum of 20 typed (single-spaced) pages, highlight the pertinent research associated with the concept plan (i.e. include a brief literature review), include a detailed summary of the associated costs related to the plan, and an realistic implementation strategy and timeline for your project. All writing should follow the guidelines laid out in the ESRM section of our campus writing guide.

You will present your proposals during the final week of class. Your in-class oral presentation (~15 minutes) component will be followed by a written version of that proposal. Taken together, your oral and written proposals will account for 25% of your course grade. Our panel of judges and your fellow students will vote for the best proposal (e.g. well thought out and rehearsed to be to the point, compelling, and materially improve campus sustainability). The project team presenting the most outstanding concept plan will receive an automatic 95% on their final exam and be excused from the final exam if they so wish.
In-Class Oral Presentation Rubric for Sustainability Proposals:

Your name: ______________

ESRM 200: Sustainability Project Evaluation Form
Fall 2014

Please evaluate each item on a scale of 1 to 5. Score a 3 if the project meets expectations, and higher if it exceeds them. Score a 5 for an exceptional poster only. Please provide comments wherever possible.

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**Content**

- __summarized succinctly?
- __lit/case study review?
- __clear improvements to CI?
- __design appropriate?
- __assessment metrics/methods?
- __outcomes reasonable?

**Presentation**

- __well organized/graphics clear?
- __professional manner?
- __answered questions?

**Logistics**

- __project highly visible?
- __implementable in 7 weeks?
- __cost est. realistic?
- __persist after semester?

**Overall**

- __aggregate assessment
- __overall creativity
- Y or N: candidate for funding?
- __TOTAL

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Here are a few examples of possible topics to get your juices flowing:

**LANDSCAPING PROGRAMS**

1. Outdoor Places: An audit of campus landscape to survey how outdoor places are used, unveil opportunities to increase function of existing spaces and create new places for teaching, learning and socializing.
2. Curriculum enrichment: Create a program to increase use of landscaping to support learning. Landscape courtyards according to learning themes (use volunteers to increase the sense of ownership).
3. Accessibility Program: Study circulation into and between campus buildings and outdoor spaces. Create a plan to ensure that every outdoor place and building is accessible to everyone.
4. Materials program: Study campus paving, furniture and materials to assess the condition and longevity and replacement costs of these materials. Develop a program to implement natural, renewable, local and reclaimed materials to enhance campus character and improve campus aesthetics.
5. Evaluate fertilizer use – which is better and more sustainable: organic or inorganic fertilizer.

WATER CONSERVATION

1. Water conservation: An audit of existing campus plants and irrigation system to compare actual water needs with irrigation schedule. Develop landscaping opportunities to control surface run-off.
2. Domestic Water Use: Evaluate existing fixtures in buildings and study options on how to reduce water uses and wastage (study availability, costs and user satisfaction for low-flow showerheads, ultra low-flow toilets, ultra low-flow faucets).
3. Health benefits and economics of bottled water vs. tap water – is bottled water healthier than tap water? What are the economics and sustainability costs of bottled water (production, transportation, landfilling).
5. Rainwater harvesting – how much rainwater can be harvested, where will you store it, cost of cisterns / tanks.

WASTE MINIMIZATION

1. Waste audit / management program: Conduct an audit of sources and types of campus waste. This is the first step in developing a successful waste management program.
2. Waste minimization program: recycling and waste destinations, and develop a program to reduce, divert and re-use waste on campus.
3. Composting program: Evaluate feasibility of establishing a composting program on campus.
4. Promote reusable water bottles: Evaluate how single-use water bottle use can be minimized.
5. Lab waste reduction: Develop a program to reduce waste generated by labs (glassware, catalogs, chemicals).
6. Hazardous waste reduction: Develop a program to reduce hazardous waste from labs.
7. Green Cleaning Program: Evaluate custodial cleaning practices and develop a green cleaning program.
8. Recycling campaign – develop and implement a recycling campaign to promote recycling.
9. Source reduction – study how products are delivered to the campus (boxes). Pick 1-2 products and evaluate how the products could be delivered by generating minimum amount of packaging wastes.
10. Build a human-powered can crusher.
11. Electric hand dryer vs paper towels – evaluate the economics and sustainability costs of each product.
12. Plastic bags – how much and how can you reduce plastic bag waste?

LAB CHEMICALS

1. Chemical tracking. Develop a tracking system to follow one or more chemicals from purchase to use to disposal. Use physical measurements, interviews, observations. Analyze data to see if chemical is being handled and disposed of in a proper, safe manner.
2. Microscale. Look for opportunities to convert lab-course experiments from conventional-scale to microscale (using tiny quantities of chemicals). Work on converting a single experiment or as many as possible from an entire course. Document the savings in purchasing and disposal costs, and the impact on the wastewater system.
3. Chemical exchange. Develop or improve the exchange of chemicals, solvents and other lab materials among labs on campus. Possibly design a web-based inventory so researchers can easily scan it for the chemicals they need.
TRANSPORTATION

1. Alternative transportation: Map how people walk or bike through campus, and create a plan to develop opportunities for recreation, walking, biking, car-pooling and public transit as alternatives to cars. Map nearby resources for everyday need and create a program to lobby for public transit systems.
2. Ride-sharing program: Promote ride-sharing programs and biking on campus.

DINING SERVICES PROGRAMS

1. Healthy Foods program: Map where campus foods come from and document opportunities to get food from local and sustainable sources. Track the actual farms and feedlots that supply the vendors who bring food to your campus. If possible, visit those places. Display labels, signs and educational materials in the cafeteria to share what you learn.
2. Locally-grown meal. Work with Islands Cafe to plan a meal made from as much locally-produced food as possible. Milk, meat, cheese, vegetables, beans, root crops, and more should all be available within an hour's drive of campus. Use this opportunity to connect campus food-buyers with small, local growers. Create accompanying educational materials to go with the meal.
3. Food economics. Where does a food-service dollar go? Does most of it go to brokers and suppliers, with little left for the farmer? Can you find ways to add higher-priced organic foods to the menu while cutting costs elsewhere to keep budgets the same?
4. Consume less food. Encourage dining services to make it easy and economical for diners to take only what they care to eat. Taking samples of new foods and getting smaller portions but being able to go back for seconds are two possibilities. This will cut the amount of food wasted.
5. Dining Service Waste Characterization Studies: Study waste streams and identify opportunities to reduce waste from dining areas (and also from other areas of campus).

PURCHASING

1. Purchasing & Procurement: Develop specifications for products, and procure recycled and local materials; reduce waste at source.
2. Printing program: Develop a program to reduce printing on paper, procure chlorine-free, recycled paper for printing.
3. Recycled Paper. Recycled paper may damage some printing equipment because contamination in the recycled fiber. Test paper with varying post-consumer waste

ENERGY CONSERVATION

1. Energy Audits: Document how energy is used on campus; optimize operation of existing control systems; monitor and report energy wastage.
   a. Exit signs. Calculate amounts of electricity needed and costs for current exit signs in one building or across campus. Include ongoing costs for replacement bulbs and maintenance. Calculate cost to replace signs with efficient LED units, along with savings in electricity and labor.
   b. De-lamping light fixtures. Use a foot-candle meter to measure light levels in hallways, building lobbies or offices, and calculate electricity and costs required. Make sure fixtures can operate properly with one or more bulbs missing, and test different configurations of bulb removal. Make sure permanent changes conform to legal light levels and building occupant needs.
   c. Outdoor lighting. Analyze outdoor lighting practices on campus and find lights that could be eliminated, or replaced with more efficient fixtures. Calculate savings before and after (OPC has completed this project.
   d. Office machine management. Use a wattage line-logger to measure electricity used over time for photocopiers, computers, fax machines, printers, other machines. Re-set machines to take full advantage of built-in energy-savings features (like BIOS settings, Energy Star, machine standby). Use line-logger to measure savings attributed to the changes. Post educational notices explaining the changes and savings.
e. **Screensaver.** Did you know that those moving, 3-dimensional computer monitor screen savers use more electricity than when the computer is in normal operating mode? Set screen savers to either a blank screen or an electricity-saving option. Calculate savings (this project is complete).

f. **Lights off.** Survey a department or building for unnecessary lighting, and document wasteful practices. Work with occupants on a "lights off" campaign, observe changes in behavior and light-switching habits, and calculate approximate savings.

g. **Daylighting.** Find places where the use of natural light can be increased, and the need for electric lights decreased.

h. **Classroom Electronic Devices Audit:** How much electricity (in KWH), $ and CO2 is wasted by not turning off computers, monitors and lights when not in use.

2. Changing Energy Use Habits: Develop education programs to reduce energy use, develop competitions between buildings and dorm units.

3. Develop Building Conservation Contact Program: Develop a team of volunteer “building conservation contacts” who will monitor energy use, identify waste reduction opportunities, etc.

**CAMPUSS GREENING PROGRAMS**

1. LEED Assessment of Existing Buildings: Assess campus buildings per LEED EB program and identify areas of improvement.

2. Communication Program: Develop a program to improve sustainability awareness amongst the students, staff and faculty.

3. Greening Commencement and Other Major Events: Evaluate waste and energy usage reduction opportunities during campus events.


*Student groups will be required to obtain approval of their topic by the end of week 5 in the semester (Sept. 24)*

**WORKING DEFINITIONS OF SUSTAINABILITY**

- **a:** of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged <sustainable techniques> <sustainable agriculture>

- **b:** of or relating to a lifestyle involving the use of sustainable methods <sustainable society>

- the capacity to endure. For humans, sustainability is the long-term maintenance of responsibility, which has environmental, economic, and social dimensions, and encompasses the concept of stewardship (the responsible management of resource use).

- The ability of the Earth’s various systems, including human cultural systems and economies, to survive and adapt to changing environmental conditions.

**WORKING DEFINITION OF SUSTAINABILITY SCIENCE**

*Sustainability science* is an informed operational philosophy of stewardship that combines (1) science—the framework of understanding and explaining the physical world through testable knowledge; (2) technology—the framework of modifying and utilizing the physical world through and economically effective design, and (3) ethics—the framework of considering actions through justice, autonomy, beneficence, non-maleficence and responsibility. Sustainability science employs mindful understanding to evaluate and guide actions that modify and utilize the physical world. It seeks to provide a framework for evidence-based reasoning to enable evaluation of benefits and consequences of human actions. An overarching goal is to encourage individual and collective actions that are informed by awareness of spatial literacy, temporal literacy, environmental literacy, capacity, scale, and systems.