HCol 186 F (CRN 12003) Ecology for Sustainability

Spring 2015

Instructor: Deane Wang

Class times: Wednesday 12:50-3:50 PM Location: U Hts South 133
Office: 268 Jeffords Hall, 656-2694, Deane.Wang@uvm.edu
Office hours: Mon: 11:30-2:00, Wed: 11:00-12:30, Thu: 2:00-4:00

Field trips:
- Ecology of Winter, Saturday 9-2 March 14, 21 (one day with a backup)
  (note: no F2F class Feb. 11)
- Bird diversity with Allan Strong 5:30 AM, April 22
  (Wednesday class time shortened)

Background:

Ecology is a rapidly expanding field full of descriptive detail, emerging theory, and connections to many other disciplines. With developing subdisciplines such as human ecology, statistical ecology, marine ecology, agroecology, industrial ecology, applied ecology, urban ecology, microbial ecology, plant ecology, behavioral ecology, political ecology, field ecology, urban ecology, food ecology, etc., the content of ecology is becoming both complex and conceptually unmanageable. A typical ecology text is very long, approaching and sometimes exceeding 1000 pages. This course takes an alternative approach to engaging with this complex ecology, with the intent that students can learn some ecology and apply it toward strategies for sustainability.

Course Goals:

For non-scientists and students not intending to be ecologists, this is an elective course that will provide fundamental concepts that can be useful in their professions -- to help find connections to sustainability and solutions to the advancing challenges of the 21st Century. This ecology course is designed to provide participants with a skeletal but grand tour of our existing "library" of ecological understanding, and then provide students with an efficient approach to mining selected ecological concepts to complement their existing knowledge. The subset of ecological knowledge introduced in the class will more directly address applied ecological issues than a more conventional ecology class.

This course also addresses the UVM General Education Sustainability Learning Outcomes. In response to the need for all UVM undergraduates to be aware and competent in thinking about a sustainable future (as emphasized by the UVM Student Government Association and the Faculty Senate), this course has been designed to meet those learning outcomes, some of which are included specifically below, and some of which are addressed in specific course activities. For more information on these general education goals, please see:
Learning Outcomes

1. Students can explain key ecological concepts,
2. students can interpret the ecological literature,
3. students can locate ecological resources for continued learning in a changing world,
4. students can apply ecological knowledge and an ecological way of thinking to real projects that will enhance sustainability of human societies,
5. students can discuss sustainability with the general public and explain its relevance to them in a variety of frameworks,
6. students can connect their ecological perspective on sustainability to both economic and social dimensions.

Course Description:

As a service-learning course that meets once a week for three hours, the class will run like a hybrid between a lab and a seminar. Short lectures, workshops, lab active sessions, online work, and individual and group reflections will be interspersed across the class period. If you like a consistent class format that gets you in a rhythm, this class is NOT for you. Much of what happens in class will take place in response to an identified educational need, a lot of which you will decide on. Topics are listed below, however, they are not scheduled ahead of time.

Through online resources, students will cover basic ecological concepts that can inform environmental decision-making and project design. Class time will only be used for review of this online material, as requested by students. The course is divided into four parts (Introducing Ecology as a Science, Survival Concepts in a Small World, Survival Concepts in a Connected World, Ecological Applications). Classes will be run more like a lab, employing a combination of mini-lectures, student in-class writing, small group discussion, class discussion, and project work. In addition, the class includes writing about ecology in a blog for a public audience. This will promote sharing of individual understandings and group synthesis. The last part of the class is concerned with ecological applications for sustainability. The project activity will involve workshop sessions, with students helping students, and group consultations with the instructor, in order to facilitate completion of class projects. The client for these projects is usually an organization within the University of Vermont that seeks to become more sustainable. This project is an important component of the course as it demonstrates the student’s ability to apply ecological knowledge to making something happen. There will be two evaluations during course of the class. There will be two weekend Field Trips and a morning field trip. TENTATIVE dates: Feb 21 (backup date Mar 14) and April 4, and one 5:30 AM field trip in April TBA (back by 8:30 AM).
List of topics

A plethora of ecological information is available in texts, news media, and on the web. A secondary goal of the class is getting students to be comfortable and capable of getting their own sources of information. Many of the readings will be located on the Encyclopedia of the Earth and other “official” sources (see examples below). Source reliability will be an ongoing discussion item. Other readings will be provided as pdfs. There are also many excellent media sources that will be used (examples below).

Part 1: Introducing ecology and sustainability
• Course introduction
  http://www.eoearth.org/article/Ecology
  http://www.ecostudies.org/definition_ecology.html
  http://computingforsustainability.com/2009/03/15/visualising-sustainability/
• The ecology of ecology
  A classic reading (pdf):
  http://www.uvm.edu/envnr/nr385se/readings/BillingsEnvironmentalComplex.pdf
  An inspiring talk on TED:
  http://www.ted.com/talks/janine_benyus_shares_nature_s_designs.html
• Evolution of structure and function
  http://www.eoearth.org/article/Evolution
  http://evolution.berkeley.edu/evolibrary/article/0_0_0/conservation_01
• Emergence of pattern and process interactions
• Ecology for sustainability
Sustaining natural systems - sustaining social ecological systems

Part 2: Survival concepts in a small world
• Exponential growth
  http://www.eoearth.org/article/Exponential_growth
  http://en.wikipedia.org/wiki/Biological_exponential_growth
• Growth in a finite world
  http://www.eoearth.org/article/Logistic_growth
  http://en.wikipedia.org/wiki/Limits_to_growth
• r and K strategies
• Positive and negative feedbacks
• Carrying capacity
• Ecosystems, open and closed systems
• Stability, resistance, and resilience
• Natural disturbance, non-equilibrium dynamics, and metastability
• Disruption, non-native invasive species, and toxins
• Evolution and ecological design

Part 3: Survival concepts in a connected world
• The diversity of life
  Another inspiring talk by E.O. Wilson on TED:
Ecosystem services
• Evolution and ecological complexity
• Diversity and stability
• Emergent properties and systems ecology
• Biogeochemical cycling and scales of time
• Landscape systems, sources and sinks
• Fragments and corridors
• Global ecology, climate change, and Gaia

Part 4: Ecological applications for sustainability, e.g.
• Ecological indicators
• Ecosystem functions and ecosystem services
• Carbon ecology and community wood energy
• Waste “disposal”
• Wind farms
• Food systems
• Conservation Commissions
• Energy and climate planning (town committees)
• Climate adaptation
• Green ecology committees

*Includes journal entries on personal applications of sustainability in the context of each applied topic. E.g. if the topic is wind, how does the student personally feel about ridgeline wind development and what kind of data could help better illuminate the issues, whether social, economic, or ecological.

Assignments

The emphasis of this class will be on reading broadly and synthesizing. Detailed ecological knowledge resulting from specific empirical research will be de-emphasized in favor of familiarity with and ability to apply broader concepts. Writing will be a key tool for the synthesis process.

Journal:

Each student will keep a study journal comprised of two parts: a log or diary of project work, and a reflective journal. The journal will be reviewed at mid-semester and at the end of the semester.

Sustainability Blog Assignment:

Each student will prepare a Blog entry (or entries) that instructs the reader about ecological concepts and their relationship to sustainability through a persuasive narrative. This assignment emphasizes descriptive and creative writing. The blog will be public and thus readable by all. However, a specific audience will need to be identified by the class as a whole.

Example Blog Assignment - Ecology is a rapidly changing and expanding field. Even the definition of ecology, as you have read in your assignments, is
changing. Find a relatively new ecological field that will help humanity survive and thrive in the 21st Century and tell its story. You might title your entry: Ecology in the 21st Century. Remember, the audience for your blog is the public, and your goal is to inform and perhaps persuade your audience of something. Examples might include: material ecology, ecological design/biomimicry, industrial ecology, or campus ecology.

**Class Projects:**

Each student will contribute to the class project to demonstrate their ability to understand and apply ecological knowledge to real objects, situations, and projects. The project will involve the a university office/academic unit as the client. This project will likely entail both quantitative and qualitative evaluation of how the office and its inhabitants function. Recommendations for action are a desired outcome of the project.

**Five Minute Presentations:**

As part of most classes, each student will make a 5 minute presentation on the ecology of a topic that peaks your interest. This will take the form of proposing a new “ecology” that should be studied in the future. Often this is something that arises out of daily life, current news, or a student’s particular passion. These presentation will provide us with another tidbit of ecological diversity.

**Resource People**

Fred Pond Library Associate Professor, Reference and Instruction
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**Evaluation**

Evaluation of student progress will be distribution among the several aspects of the course. Class participation - 10% (in-class participation, presentation, field trips)

Class assignments - 10%
Journal - 10%
Blog entries - 20%
Two Exams - 15% each
Service-learning project - 25%

**ACCESS:**

In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of
Disability Services on campus. ACCESS works with students to create reasonable and appropriate accommodations via an accommodation letter to their professors as early as possible each semester. They are located at A170 Living/Learning Center, and can be reached by phone at 802-656-7753, or by emailing access@uvm.edu. Visit their website at http://www.uvm.edu/access.

**Code of Academic Integrity:**

See: http://www.uvm.edu/%7Euvmppg/ppg/student/acadintegrity.html

For the full policy at UVM

All academic work (e.g., homework assignments, written and oral reports, use of library materials, creative projects, performances, in-class and take-home exams, extra-credit projects, research, theses and dissertations) must satisfy the following four standards of academic integrity:

1. All ideas, arguments, and phrases, submitted without attribution to other sources, must be the creative product of the student. Thus, all text passages taken from the works of other authors must be properly cited. The same applies to paraphrased text, opinions, data, examples, illustrations, and all other creative work. Violations of this standard constitute plagiarism.

2. All experimental data, observations, interviews, statistical surveys, and other information collected and reported as part of academic work must be authentic. Any alteration, e.g., the removal of statistical outliers must be clearly documented. Data must not be falsified in any way. Violations of this standard constitute fabrication.

3. Students may only collaborate within the limits prescribed by their instructors. Students may not complete any portion of an assignment, report, project, experiment or exam for another student. Students may not claim as their own work any portion of an assignment, report, project, experiment or exam that was completed by another student, even with that other student’s knowledge and consent. Students may not provide information about an exam (or portions of an exam) to another student without the authorization of the instructor. Students may not seek or accept information provided about an exam (or portions of an exam) from another student without the authorization of the instructor. Violations of this standard constitute collusion.

4. Students must adhere to the guidelines provided by their instructors for completing coursework. For example, students must only use materials approved by their instructor when completing an assignment or exam. Students may not present the same (or substantially the same) work for more than one course without obtaining approval from the instructor of each course. Students must adhere to all library course reserves regulations and refrain from mutilating library material, which are designed to allow students access to course materials. Violations of this standard constitute cheating. **When in doubt about**
plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

A related set of policies are listed under:

**Code of Student Rights and Responsibilities**

http://www.uvm.edu/~uvmppg/ppg/student/studentcode.html

Also see **Our Common Ground** statement of values at UVM

http://www.uvm.edu/about_uvm/?Page=values.html

**Religious Holidays**

Students have the right to practice the religion of their choice. Each semester students should submit in writing to their instructors by the end of the second full week of classes their documented religious holiday schedule for the semester. Faculty must permit students who miss work for the purpose of religious observance to make up this work.

Link to Interfaith Calendar:  http://www.interfaithcalendar.org/2014.htm