NEW COURSE!
Sonoran Desert Discovery
ECOL 464/564 (3 credits)
Fall 2009: Monday 4:30-6:00 pm on campus
& four half-day Saturdays at Biosphere 2

- Develop biology-education workshops for visitors to Biosphere 2.
- Work collaboratively, consult experts on campus, & visit a local K-12 classroom.
- Learn more about ecology, biology, and specific topics in the Sonoran Desert.
- Acquire skills for developing and teaching age- and background-appropriate lessons that improve the public's understanding of local biology and global ecology.
- Course format expands upon the successful UA Marine and Insect Discovery programs.

Prerequisites: Some biology/ecology background (e.g., ECOL182), Ecology 302 and other EEB courses will be helpful, but are not required.

Dr. Kevin E. Bovere
Ecology & Evolutionary Biology
kebover@email.arizona.edu

Syllabus:

Sonoran Desert Discovery:
Biosphere 1 at Biosphere 2, ECOL 464/564 (3 credits)
A multi-level educational offering that links the University of Arizona, biology, and the public.

- Course may be taken three times for up to 9 units of total credit.
- Prerequisites: ECOL182 or equivalent biological/ecological background. Ecology 302 and other EEB courses will be very helpful, but are not required.

Syllabus, Fall 2009

Goals:
1. Develop a flagship outreach program to expand educational opportunities for southern-Arizona residents (kindergarten to retiree) and visitors to learn about biology, ecology, and ecosystems. This will be done through exploration of our unique Sonoran-desert and sky-island biomes, and by leveraging the visibility, expertise, & facilities of B2, EEB, & the UA.
2. Engage UA students in teaching and outreach while furthering their ecological education.
3. Foster increased dialogue between UA faculty and students in both formal and informal settings.
Meeting Times
Mondays 1630-1800h in Shantz 247 (http://iwieww.coit.arizona.edu/smap/staticLarge-SHINTZ.html)

Workshops: On Saturdays at Biosphere 2 (see schedule below). Transportation will be provided between UA campus and B2.

Field Trip: All day Saturday 12 September is a mandatory field trip that will introduce you to the Sonoran Desert, Biosphere 2, and this Sonoran Desert Discovery course.

Classroom visit: You will spend two hours sometime during the first few weeks of the semester visiting a K-12 biology/ecology classroom.

Faculty expert: You will also meet twice (or more) with a faculty expert regarding your topic and your workshop. See below for details.

Other work will be accomplished with your peers outside of scheduled class time.

Instructors
Kevin E. Bonine, Ph.D., kebonine@u.arizona.edu
Office Hours: BGE 113, Wed 3-4pm, Thur 4-5pm, and by appointment.
Tel: 626-0092, Home: 751-1349 (please call before 9pm or after 7am)

Graduate Teaching Assistant: Tiffany Alvarez, tda@u.arizona.edu
Office Hour: Tues & Fri 1-2pm in Shantz 503, and by appointment.

Office Hours

Books

Course Materials (The two required texts are available at the UA bookstore.)

Other readings will be made available electronically on course website. Please check 464/564 course website regularly for updates, changes, and/or additions.

Website

Web Site
We will maintain a course website (http://eetweb.arizona.edu/eeb_course_websites.htm) with readings, assignments, schedules, announcements, etc. Check 464/564 website for updates. We may also use a D2L website (http://d2l.arizona.edu/) for posting grades.
Assignments & Grading etc.

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<thead>
<tr>
<th>Course Work</th>
<th>Total Semester Points: 1000</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>100</td>
</tr>
<tr>
<td>Participation (including 50 pts for your assessment of peers)</td>
<td>200</td>
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<tr>
<td>Essays (~3 pages, five at 40 points each)</td>
<td>200</td>
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<td>Outreach Workshop (details below)</td>
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**Honors** (200 additional points; total of 1200)

This course is available for honors credit by contract. Please discuss with your instructors, and get approval for, the enhancements you propose to warrant honors credit. All work will be due by the regularly scheduled final exam.

**564** (200 additional points; total of 1200)

Students enrolled for graduate credit (564) have two options:

1. Propose a project appropriate for graduate credit in this course. If we agree that your proposed project is outstanding then you will be free to pursue it. Otherwise...
2. Outreach Packet (modified from Tiffany Alvarez proposal):
   - Choose an age group such as elementary, middle, or high school level.
   - Tailor an outreach packet that would be submitted to teachers before a prospective outreach visit. The packet would allow teachers to brief students on the topic before the visit, provide the teacher with supplemental material for use during the presentation and after, and include an evaluation form to assess the effectiveness of the outreach endeavor.

Grade Expectations

Keep in mind the following, adapted from J.M. Williams (1993, Clarifying grade expectations, *The Teaching Professor* 7(7):1):

- **The “A” Student—An Outstanding Student**
  - *Attendance:* “A” students have virtually perfect attendance. Their commitment to the class resembles that of the instructor.
  - *Preparation:* “A” students are prepared for class. They always read the assignment. Their attention to detail is such that they occasionally catch the instructor in a mistake.
  - *Attitude:* “A” students have a winning attitude. They have both the determination and the self-discipline necessary for success. They are curious and they show initiative. They do things they have not been told to do.
  - *Talent:* “A” students have something special. It may be exceptional intelligence and insight. It may be unusual creativity, organizational skills, commitment—or a combination thereof. These gifts are evident to the instructor and usually to the other students as well.
  - *Results:* “A” students make high grades on assignments—usually the highest in the class. Their work is a pressure to grade.
Easy A's

Getting a good grade at the UA isn't necessarily a noteworthy accomplishment

By HANK STEPHENSON

Alex Gendreau, a junior majoring in dramatic arts at the University of Arizona, was surprised when she got a B in an acting class. She had gone to all the classes, written all the papers and earned a high A on her final.

When Gendreau sent an e-mail to her professor asking why she got the B, the professor changed it to an A.

"She never told me why she changed the grade," Gendreau says. "It was weird."

With that A, Gendreau received the most prevalent letter grade being awarded on the UA campus. During the Spring 2008 semester, 41 percent of all undergraduate grades at the UA were A's, according to a database obtained and analyzed by the Tucson Weekly through a Freedom of Information Act request.

The database—of roughly 3,000 undergraduate courses and more than 70,000 grades assigned—revealed that 74 percent of all grades were either A's or B's. "Average" C grades made up only 10 percent of the total, while below-average D's and F's (the equivalent of an F, or failing grade) totaled only 10 percent collectively.

The data points to two possible scenarios: Either 74 percent of students are above average, or the meaning of "average" has changed. The latter scenario is known as grade inflation.

Grade Inflation at the University of Arizona

by Jonathan Penner

GRADE INFLATION: CAUSES, CONSEQUENCES, CURES

Grade inflation at the University of Arizona has become a matter of serious concern. We are steadily approaching a time when most students will be getting A's in most of their courses. The average GPA of graduating seniors has risen normally:

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<th>Year</th>
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WHAT SHOULD GRADES MEAN?

Grading measures the quality of student performance. Some members of COG participants believe that grades are finest and most accurate when they indicate achievement as follows:

A---Achievement of distinction.
B---A high level of achievement.
C---A fair level of achievement.
D---A low level of achievement.
E---Failure to fulfill minimum requirements.
Attendance
You are expected to attend each class session prepared and ready to contribute. Ask yourself if you have read the assigned material. Did you retain enough to do well on a short quiz? Did you take notes on your reading? Can you ask intelligent questions or provide meaningful insights?
All holidays or special events observed by organized religions will be honored for those students who indicate affiliation with that particular religion. Absences pre-approved by the UA Dean of Students office will be honored.

Show up and Contribute!

Class meeting suggestions:
In addition to paying attention and turning off electronic devices such as iPod and cell phone, please consider employing these suggestions (modified from Guy McPherson) during class discussions:

1. Listen carefully to others before speaking
2. Challenge and refine ideas, not people
3. Focus on the best ideas, not on being the best, or “winning”
4. Before adding your own contribution, practice listening by trying to formulate in your own words the point that the previous speaker made
5. Speak whenever you wish (without interrupting) even though your ideas may seem incomplete
6. Avoid disrupting the flow of thought by waiting until the present topic reaches its natural end before introducing a new issue
7. If you wish to introduce a new topic, warn the group that what you are about to say will address a new topic and that you are willing to wait to introduce it until people are finished commenting on the current topic
8. Give encouragement and approval to others
9. Always be prepared to ask an intelligent question of the current speaker if called upon – this helps you to stay mentally engaged.

Coursework Details

Class Meetings
We will meet on Monday afternoons to discuss the readings and prepare our workshops. Please plan to participate actively in all aspects of our meetings. If you do not want to engage and discuss, then this is probably not the course for you. You will also spend considerable time working on your own or in small groups outside of scheduled class sessions. Four Saturday meetings are also planned. See schedule below.

Workshops
Hands-on educational engagement with the public at Biosphere 2 is at the heart of this course. You and your peers will develop topics and workshops that convey important biological, ecological, and ecosystem principles to the public through the lens of the Sonoran Desert. You will present twice to the public, once with “families” and once with “scientifically literate adults” as your target audience. Therefore, you may be engaging with anyone from pre-kindergarten to retiree. Your workshop should include hands-on activities, discussion, visual aids, etc. We will work as a group to come up with excellent outreach tools. You will also consult with UA faculty and/or other local experts to focus the goals of your workshop, refine the facts you will present based on the latest scientific research, and inform the lessons you hope to impart. We expect that you will meet with your faculty consultant early in the semester and again in the middle of the semester. Note that you may have a small budget for obtaining supplies as you prepare your module. You will need to spend considerable time outside of scheduled class time to develop your workshop. An acceptable draft of your workshop must be approved before you present to the public.
Workshop Progress

You will turn in several items (often electronically) for instructor feedback and grades:
1. Workshop Topic (developed in concert with classmates and instructors) (a-c in template; 25 points)
2. Introduction and Background (e in template; 75 points)
3. Outreach Goals (who will you teach what at Biosphere 2?) (h in template; 25 points)
4. Tools and Approach to achieve educational goals (what will your workshop comprise?) (j in template; 75 points)
5. Workshop in lesson-plan format (see below), including modifications for two different audiences and improvements based on feedback (completed template to be posted on our course website; 150 points – peer grading to be included)
6. Assessment (did your workshop achieve your educational goals?) (written results from o in template after your first public presentation; 50 points)
7. Refinement of your workshop (after assessment and feedback from your first public interaction) (what did you change in the template and why? 50 points)
8. Summary Evaluation and Recommendations (what worked and didn’t work in your workshop? what would you keep, what would you change? 50 points)

Please turn in all previous work with each new submission so that improvement and progress can be noted.

Some excellent examples of outreach modules are available at Dr. Katrina Mangin’s UA Marine Discovery website (http://marinediscovery.arizona.edu/lessons.html). Please refer to these early and often to get an idea of how to structure your workshop.

Workshop Lesson Plan Template

You will use the following lesson-plan template (slightly modified from one found on the UA Marine Discovery Website) as you develop your workshop:

- Project title or topic of activity
  - Author(s) & date
  - Summary of activity (approx. 100 words)
  - Target audience (or grade levels)
  - Introduction & background information (what is the science behind the workshop?)
  - Credit for the activity (modified from a previous workshop or lesson plan?)
  - Estimated time to do the activity
  - Goals of activity
    - National Science Education Standards (NSES)
      - Two content standards that this lesson plan covers
  - Materials needed
  - Preparation and tips for presenter(s)
  - Step-by-step procedure for the activity
  - Images, work sheets, web links
  - Items for discussion (or conclusion)
    - Questions to participants
  - Assessment
  - Beyond the activities
    - Relate to and extend the complexity of the workshop
  - Web Resources
  - Additional References
  - Key words/glossary
  - Acknowledgements
Consultation & Observation

Engagement with Experts
As described above, you will interact with UA faculty and/or experts of similar caliber elsewhere in the Tucson community. You and your peers and instructors will work together to identify appropriate experts to meet with twice during the semester.
You will also be visiting a K-12 classroom in Tucson to instigate your thinking and discussion about the realities of teaching and learning. Possible options include, but are not limited to:
- Angela Urban, AP Biology, Environmental Biology, Amerischools College Preparatory Academy
- Margaret Wilch, Biology and Science, Biotechnology, Tucson High School
- BioME collaborations between UA science graduate students and local K-12 classrooms
You will need to get approval for your specific classroom visit from the instructors and make final arrangements on your own.

All of these experts are invited to join us for our Monday meeting/celebration 07 December. Location TBA.

Essays (approx. 3 typed pages each; 40 points each; 200 points total):
Part of your learning process necessitates critical reflection on what you have seen and done. To foster reflection and develop written communication skills, we are assigning five essays due at different points during the semester. You are expected to develop and support one or more arguments in your essay. Using logic and references in a well-organized paper will result in the best essays that also merit the most points. Writing should be grammatically correct and free of typographical errors and other sloppy mistakes. Having others proofread your work, or visiting the campus writing center, will substantially improve the final product. Please follow the parenthetically cited reference formatting as seen in published scientific papers in the journal Ecology (http://esapubs.org/esapubs/journals/ecology.htm).

1. Choose a specific biological topic that is relevant to the concept of a ‘sky island’. Describe and explain that topic to an audience of high-school students. Get instructor approval of your essay topic before you begin writing.
2. What research does your faculty consultant (expert) do? Why is knowledge of their field and its findings important to the public? [Please include detailed contact information for your expert(s)]
3. What did you learn about teaching biology from visiting your classroom for two hours? In what ways did your visit highlight similarities and differences from the Dewey approach we have read about? [Please include detailed contact information for your teacher(s)]
4. You have spent a fair bit of time this semester actively engaged in teaching (and learning) biology. Discuss the similarities and differences between teaching and learning. How does the age or background of the student affect either teaching or learning, or both?
5. Topic to be announced later in the semester.

Learning, Reflecting, Writing and be prepared to share out loud some of your writing with your peers and instructors.
You will need to spend time outside of scheduled class activities to develop and refine your B2 Workshop.
1. Where is the Sonoran Desert?

2. Find person with most similar map.

Be able to introduce your partner:

- Name
- Background
- Familiarity with Sonoran Desert (why map drawn the way it is?)
- Unique physical attribute of partner
- Goals in the course

- What other features can you identify on the map?
What makes the Sonoran Desert unique?

Discussion

What should the public know about biology, especially in the realms of ecology and evolution? Why?

What should the public know about the Sonoran Desert?
Reading Assignments:

For Monday 31 August:
A Natural History of the Sonoran Desert (Phillips & Comus, eds., 2000)
Pages: 1-2 Introduction
3-18 Biomes and Communities of Sonoran Desert
25-28 Monsoon etc.
and Zepeda poem, Wind
[optional: Floods of 1993]
71-85 Geologic Origins
119-126, 525 Biodiversity & Pupfish
529-531 Reptiles & Amphibians
577-585 Rattlesnakes

For Saturday 07 Sept:
Handouts on website
Choose species to “present” (list on website, tell Tiffany choice 31 Aug)

Monday 14 Sept:
Choose a Sonoran Desert topic and find a scientific paper about it.
Bring the abstract of the paper and be ready to say a few words about
the topic and the paper. Email the citation to Tiffany before class.
Readings from Dewey book.

Packrat
Turkey Vulture
Mexican Jay
Pleasing Fungus Beetle
Butterflies
Saguaro
Ocotillo
Brittlebush
Prickly Pear
Oaks
Grasses
Yuccas
Agaves
Ponderosa Pine
Douglas Fir
Alligator Juniper
Corkbark Fir