BIO 130: Introduction to Environmental Science
New College of Interdisciplinary Arts & Sciences
Arizona State University

Instructor Information

Dates of classes:  
Summer Session I, 2011
Instructor: Dr. Susannah Sandrin
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Office Hours: TBD
Office Location: FAB S269B

Course Information

Catalog Description
Introduces soil resources, their physical and chemical properties, classification, energy dynamics, and the role they play in environmental quality.

Course Format
Lecture/discussion + laboratory

Course Goals & Student Outcomes
By the end of the course, students will be able to:

• Identify the role that humans, and other animals, play in the cycling of energy and resources on Earth.
• Describe and distinguish the four Earth spheres of biosphere, atmosphere, lithosphere and hydrosphere and how energy and matter is cycled through these spheres.
• Explain the importance of ecosystems and biodiversity on human survival.
• Construct informed arguments about public policy, especially regarding energy production and renewable versus nonrenewable resources, that can improve our environmental outlook.
• Make predictions, based on scientific models and calculations, about energy use/consumption, land use, and human population numbers.
• Explain the complexity of global climate change models and the data behind them.
• Compare and contrast the environmental risks that impact their lives (in terms of cultural, biological and chemical hazards) with those of people living in developing nations.
• Describe anthropogenic effects on the environment.
• Use their understanding of the issues surrounding solid waste disposal to develop strategies for waste reduction and increased recycling of wastes.

Required Course Texts, Materials and Resources


3. ASU Blackboard Course Management Website at [http://myasucourses.asu.edu](http://myasucourses.asu.edu) (All ASU students have FREE access to this web resource)

4. A laboratory notebook with bound/attached pages & a calculator.

**Tentative Course Content Calendar**

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<tr>
<th>Week/Topic #</th>
<th>Topic(s)</th>
<th>Textbook Chapter(s)</th>
<th>Corresponding Assignments/Activities</th>
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| 1            | Unifying Themes of Environmental Science; Basic Needs of Living Things; Foundation Concepts | 1 & 3               | **Disc:** Rank environmental issues, Conservation of energy demonstrations  
**Lab:** Safety & Intro to Science Inquiry |
| 2            | Essential Resources: Soil & Water (including water cycle, rock cycle and soil generation) | 10, 11.1, 11.2 + outside | **Lab:** Water distribution demonstration & Physical properties of soil (texture, water capacity, moisture)  
**Disc:** Are soil and water “renewable resources?” |
| 3            | Populations & Communities, Ecosystems                                     | 4 & 5               | **Lab:** Chemical properties of soil, pH  
**Disc:** Where do (humans) we fit in the biomass pyramid? |
| 4            | Ecosystems & Biodiversity                                                 | 5 & 6               | **Lab:** Chemical properties of soils, Nutrient capacity  
**Disc:** What value(s) do you place on biodiversity? The world? |
| 5            | Soil & Water as Resources                                                | 10.4, 11.3, 12.1 -12.2, 8 | **Tour:** Wastewater treatment plant  
**QA:** Human population projections & Ecosystem population dynamics (moose & wolves example)  
**Disc:** How are soil and water related in the “desertification?” |
| 6            | Human Population & **Exam 1**                                            | 8                   | **Lab:** Earth System Science  
(adapted from [http://serc.carleton.edu/eslabs/climate/index.html](http://serc.carleton.edu/eslabs/climate/index.html))  
**QA:** Personal carbon use and emissions (EPA on-line) |
| 7            | Energy from Fossil Fuels & Air Pollution from Fossil Fuels               | 14 & 19.2 – 19.3    | **Lab:** Earth System Science  
(adapted from [http://serc.carleton.edu/eslabs/climate/index.html](http://serc.carleton.edu/eslabs/climate/index.html))  
**QA:** Personal carbon use and emissions (EPA on-line) |
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| 8       | Global Climate Change                                               | 18      | Lab: Drought (adapted from [http://serc.carleton.edu/eslabs/drought/index.html](http://serc.carleton.edu/eslabs/drought/index.html))  
|         |                                                                     |         | Disc: Is global climate change real? How will it affect you? |
| 9       | Nuclear Power & Renewable Energy                                    | 15      | Lab: Sustainable Energy Sources – Are they enough?  
|         |                                                                     |         | Disc: Should we expand nuclear power production? Risks & benefits |
| 10      | Renewable Energy, continued                                         | 16      | Tour: Solar panels on campus  
|         |                                                                     |         | Disc: Your energy plan for the future (if you were US Secretary of Energy) |
| 11      | Energy Summary & EXAM 2                                             | 17      | Lab: Acid Rain & Natural Buffers  
|         |                                                                     |         | Disc: What do you “fear” most – biological, chemical or cultural hazards? Why? |
| 12      | Environmental Health & Human Hazards                                | 19.1, 19.4, 20, | Lab: Oil-spill clean-up techniques  
|         |                                                                     |         | Disc: Which air/water hazard is most harmful to humans? |
| 13      | Air, Water & Soil Pollution, Impacts & Prevention                   | 22.1-22.3, 21 | Tour: City of Phoenix solid waste & recycling center  
|         |                                                                     |         | Disc: Who should pay for removal and clean-up of unclaimed hazardous waste? |
| 14      | Finish Pollution, Solid waste & recycling                           | 23      | Lab: Project presentations  
|         |                                                                     |         | QA: Sustainable communities & growth  
|         |                                                                     |         | Disc: How can YOU make your community more sustainable? |

**Grading/Assignments**

Quantitative Assignments (QA: 15%)
There will be 3 graded assignments during the semester. These assignments can be found in your lab manual and are denoted by “QA” in the Course Calendar above. Additional instructions for these activities will be posted in Blackboard in our course site. Each activity is weighted equally.

Experimental laboratory & field trip reports (30%)
This semester we will conduct 10 laboratory activities (see “Lab” in the Course Calendar above) and go on 3 field trips (see “Tour” in the Course Calendar above) during our scheduled laboratory time. These will cover a wide range of topics related to environmental science. Students are expected to attend ALL of the scheduled laboratory activities and field trips. The instructor understands about illnesses and emergencies, however, only 1 excused absence will be permitted. After 1 excused absence, students may be dropped from the course as per the policy of the Division of Mathematical and Natural Sciences of the New College of Interdisciplinary Arts and Sciences.

Students are expected to arrange transportation to the field trip locations. Carpooling is a great option! One of the “field trips” will be on campus.

Following each laboratory exercise or field trip, students will need to turn in a report (due exactly one week/7 days from the date of the exercise or field trip). In the case of the laboratory exercises that are in the lab manual, students will turn in their data sheets and answers to the questions at the end of the exercise (or copies from the book, if you want to keep your book intact). A list of questions for each tour will be available on Blackboard.

Discussion participation (10%)
This course will foster active learning through discussion participation and experiences that take place during the laboratory period. Students are expected to participate in discussions (either on Blackboard or in-class), and each student will be assigned to lead a discussion topic during the semester (either on Blackboard or in-class). The weekly discussion topics are listed as “Disc” in the Course Calendar above.

Environmental Issues Project (10%)
For this project, you may work independently or with a partner. You will act as both a scientist(s) and a policy maker(s). You will identify an environmental issue, write a statement and hypothesis regarding an environmental issue and analyze your hypothesis with data (that you collect experimentally OR that you find and synthesize from credible sources and then plot and analyze). Each student (or group of students) will defend this policy in a 10-15 minute presentation on the last lab period of the semester. We will explore some on-line data sources and lab techniques that you may want to use during our lab meetings, to help you with ideas. Please discuss your ideas with the instructor before moving forward with data collection and analysis. You must submit a pre-proposal outlining the problem you would like to explore, the hypothesis that you will be testing and a brief description of your data collection process by the date of Exam 2. Some examples (including some from past students) include:

- Urban sprawl: How Phoenix can learn from ______
- Celebrating a more sustainable (Christmas, or could choose other) holiday
- Making the case for outlawing disposable plastic water bottles/plastic shopping bags
- Using low-tech and eco-friendly oil spill clean-up techniques
- Phoenix to implement “pay as you throw” waste disposal
More information about project and presentation requirements are listed on Blackboard.

**Exams (10% each for Exams 1 & 2, 15% for Exam 3)**

Three exams will be given throughout the semester, covering the material that preceded each exam. Exam 3 will be the only cumulative exam, which will cover all the material from the course. Exams will be a mixture of multiple choice, short answer, and short essay. The reading and discussion questions, and chapter outlines posted in Blackboard are excellent resources for helping you prepare for the exams. There are also practice quizzes at your textbook’s website [www.masteringenvironmentalscience.com](http://www.masteringenvironmentalscience.com) to help you prepare for the exams.

**Course/Instructor Evaluation**

The course/instructor evaluation for this course will be conducted online 7-10 days before the last official day of classes of each semester or summer session. Your response(s) to the course/instructor are anonymous and will not be returned to your instructor until after grades have been submitted. The use of a course/instructor evaluation is an important process that allows our college to (1) help faculty improve their instruction, (2) help administrators evaluate instructional quality, (3) ensure high standards of teaching, and (4) ultimately improve instruction and student learning over time. Completion of the evaluation is not required for you to pass this class and will not affect your grade, but your cooperation and participation in this process is critical. About two weeks before the class finishes, watch for an e-mail with "NCIAS Course/Instructor Evaluation" in the subject heading. The email will be sent to your official ASU e-mail address.

**Withdrawals:** The instructor will NOT withdraw students for any reason. Specifically, students should be aware that non-attendance will NOT automatically result in their being dropped from the course. Therefore, if a student does not attend class during the first week or for any extended period of time during the semester, they should not presume that they are no longer registered. It is the student’s responsibility to be aware of their registration status.

Please note the following dates:

**Drop/Add Deadline**
**Tuition and Fees 100% Refund Deadline**
**Course Withdrawal Deadline**
**Complete Withdrawal Deadline**
(Undergraduate students must request a complete withdrawal in person)
**Last Day of Classes**

Any withdrawal transaction must be completed by ________________, at the registrar’s office. If not, you will still be officially enrolled and you will receive a grade based on your work completed.
For additional information about ASU’s withdrawal policy and the possible consequences of withdrawing from a class, contact Registration Services or your academic counselor.

**Students are responsible for their registration status!**

The Grade of Incomplete: A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents a student who is doing acceptable work from completing a small percentage of the course requirements at the end of the semester. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed. A grade of incomplete will NOT be awarded unless there is documented evidence of extreme personal or immediate family hardship. Changes in work hours, child-care emergencies, or other similar personal problems will not be approved as reasons for awarding incompetes. The Director of the Division of Mathematical and Natural Sciences must approve all incomplete grade requests.

Reasonable Accommodations for Students with Disabilities: The Disability Resource Center (DRC) provides information and services to students with any documented disability who are attending ASU West. Individualized program strategies and recommendations are available for each student as well as current information regarding community resources. Students also may have access to specialized equipment and supportive services and should contact the instructor for accommodations that are necessary for course completion.

Academic Integrity and Code of Conduct: As defined in the ASU Student Academic Integrity Policy: http://provost.asu.edu/academicintegrity.

Each student has an obligation to act with honesty and integrity, and to respect the rights of others in carrying out all academic assignments. A student may be found to have violated this obligation and to have engaged in academic dishonesty if during or in connection with any academic evaluation, him or her:

- Engages in any form of academic deceit;
- Refers to materials or sources or employs devices (e.g., audio recorders, crib sheets, calculators, solution manuals, or commercial research services) not authorized by the instructor for use during the academic evaluation;
- Possesses, buys, sells, obtains, or uses, without appropriate authorization, a copy of any materials intended to be used for academic evaluation in advance of its administration;
- Acts as a substitute for another person in any academic evaluation;
- Uses a substitute in any academic evaluation;
- Depends on the aid of others to the extent that the work is not representative of the student's abilities, knowing or having good reason to believe that this aid is not authorized by the instructor;
- Provides inappropriate aid to another person, knowing or having good reason to believe the aid is not authorized by the instructor;
- Engages in plagiarism;
- Permits his or her work to be submitted by another person without the instructor's authorization; or
- Attempts to influence or change any academic evaluation or record for reasons having no relevance to class achievement.

“PREFIX/NUMBER” follows the ASU Academic Integrity Policy in the administration of all course examinations and assignments. Violations of the University Academic Integrity policy will not be ignored. Penalties include reduced or no credit for submitted work, a failing grade in the class, a note on your official transcript that shows you were punished for cheating, suspension, expulsion and revocation of already awarded degrees. The university requires that the implementation of any of these penalties for violations of the academic integrity policy be reported to the Dean’s office. The Integrity Policy defines the process to be used if the student wishes to appeal this action.

In “PREFIX/NUMBER” you are expected to follow the ASU Student Code of Conduct (http://www.asu.edu/aad/manuals/usi/usi104-01.html) especially when communicating with your peers, instructors, and teaching assistants. Violations of the student code of conduct may result in withdrawal from the class.

**Final Exam Make-up Policy**: The final exam schedule listed in the Schedule of Classes will be strictly followed. Exceptions to the schedule and requests for make-up examinations can be granted only by the director of the Division of Mathematical and Natural Sciences for one of the following reasons:

1) religious conflict  
2) the student has more than three exams scheduled on the same day  
3) two finals are scheduled to occur at the same time

Make-up exams will NOT be given for reasons of non refundable airline tickets, vacation plans, work schedules, weddings, family reunions, or other such activities. Students should consult the final exam schedule before making end-of-semester travel plans.

If there is a last-minute personal or medical emergency, the student may receive a grade of Incomplete and makeup the final within one calendar month. The student must provide written documentation and be passing the class at the time to receive an Incomplete. A signed “Request for Grade of Incomplete” must be submitted by the student and approved by the student’s instructor and the Director of the Division of Mathematical and Natural Sciences.
The instructor reserves the right to make changes to this syllabus as needed.

If you find it necessary to leave a note for this instructor, please contact the divisional office of Mathematical & Natural Sciences located in CLCC1 room 217.