Course Learning Objectives

By the end of the course, a student should be able to

1.) Describe how humans - as animals - must use nature to survive
2.) Explain how the laws of thermodynamics place fundamental limits on our use of nature
3.) Compare and contrast ways in which people have distinguished between the use and abuse of nature
4.) Summarize ways in which sustainability has been defined
5.) List environmental problems that are the result of unsustainable human behavior, and explain the root causes of environmental problems
6.) Explain core concepts in ecology, and summarize our ecological understanding of environmental problems
7.) Explain how human health is related to land health
8.) Summarize changes in design/architecture, economics, policy, and education that promote sustainability
9.) Articulate his/her own environmental ethic, and list actions to reduce his/her ecological footprint

Planned Activities to Address Outcomes

(##) indicates learning objective addressed

1.) Readings
   Students will read book chapters and essays on the following topics: sustainability (4, 5, 8), environmental ethics (3, 9), root causes of environmental problems (5), principles of science (6), industrial vs. sustainable agriculture (5, 6, 7), ecological design (8), ecological economics (8), government and politics (8)

   Students will read news articles on the contemporary environmental problems related to the following topics: ecosystem services (4, 5, 6), community ecology (6), biodiversity (6), water resources (5, 6, 7), air pollution (5, 6, 7), energy (5, 6, 7), and hazardous waste (5, 6, 7)

2.) Online activities
   Students will complete online learning activities on the following topics in environmental science: energy and thermodynamics (1, 2, 6), autecology (1), evolution (6), ecosystem ecology (6), population ecology (6), human population growth (5, 6), agriculture (5, 6), water resources (5, 6), air pollution (5, 6), climate change (5, 6), energy (5, 6), waste (5, 6)
3.) **Active Learning Exercises During Lecture**
   Students will complete active learning exercises on most lecture topics. Activities will include clicker questions, group discussions, minute papers, data interpretation, and hypothesis generation.

4.) **Discussion**
   Discussion sections will complement lectures by allowing students to read about, discuss, and “take sides” on environmental issues in face-to-face and online formats. Material for discussion will come from essays, online activities, and news on contemporary environmental issues. Face-to-face meetings will primarily consist of small group discussions, whereas online meetings will often require students to post responses to questions in online forums. Discussion topics include: sustainability (4, 5, 8), environmental ethics (3, 9), ecological footprint (2, 4), ecosystem ecology (6), ecosystem services (1, 4, 5), human population growth (5, 6), genetically-modified foods (6, 7), water resources (5, 6, 7), climate change (5, 6, 7), energy (5, 6, 7), and ecological economics (8).

**Assessment Plans**

1.) **Exams**
   Students will complete two midterms and a final exam that cover objectives 1-9. The final exam will include an essay question that focuses explicitly on objective 9.

2.) **Pre-Lecture Quizzes**
   Students will complete online pre-lecture quizzes on the readings and online activities (above) required for each lecture.

3.) **Discussion Evaluation**
   I will assess whether students achieve learning objectives addressed in discussion by evaluating 1) written responses to discussion questions (online and face-to-face) 2) student’s ability to discuss environmental issues orally (face-to-face).

4.) **Pre and Post-Course Assessments**
   I have constructed an assessment with questions directly related to each learning objective. Students will anonymously complete pre- and post-course assessments to, allowing me to evaluate 1) prior knowledge of environmental issues, and 2) achievement of course goals.
IB105 – Environmental Biology
Course Syllabus and Policies

Instructor

Bradley Cosentino
Program in Ecology, Evolution, and Conservation Biology
Office: Natural Resources Building 68 (southeast corner of Sixth and Peabody St.)
E-mail: bcosen1@illinois.edu

Office Hours & Contact

Office Hours
Fridays, 11:00 A.M. – 12:00 P.M. or by appointment

Email is a good way to contact me about lecture and discussion topics. Emails received after 5:00 P.M. will typically not be answered until the following morning, and those received on the weekend will not be answered until Monday morning. Please start the subject of your email with “IB105”. Keep in mind that your TA can answer many of your questions, so I suggest contacting them first in most cases.

Course Information

Website
http://www.life.illinois.edu/ib/105/ (includes link to course Moodle site)

Lectures
Tuesdays and Thursdays, 10:00-10:50 A.M., Foellinger Auditorium

Discussions
IB105 is a blended learning course. Discussion format will alternate week-to-week between face-to-face meetings and online activities. Face-to-face meetings last 50 minutes and occur in 176 Burrill Hall.

Credit
3 credit hours

Course Materials

Required
1.) Mastering Environmental Science online learning platform Course ID: IB105ENVBIO
http://www.masteringenvironmentalscience.com/
2.) I-clicker for answering in-class questions (purchase at bookstore, bring to every lecture)

Recommended
1.) Wright and Boorse, Environmental Science: Toward a Sustainable Future, 11th Edition
(Hard copy ISBN: 0321682661, e-text ISBN: 0321672674; *both include Mastering Environmental Science online platform)
Course Objectives

This course is predominately an introduction to the biology of environmental problems. However, environmental problems are immensely complex, involving aspects of history, philosophy, behavior, science, economics, social justice, and politics. No single discipline or academic department can be used alone to understand or solve environmental problems. Thus, this course is designed to engage you with a broad perspective on our relationship with land, water, air, and other living things. In short, the overarching goal of mine is to help you become an ecologically literate citizen.

Ecological literacy involves a basic understanding of how the world works, and the ability to see and understand the connections between living and nonliving things. It involves an ability to understand that the laws of thermodynamics impose limits on our use of nature. On an individual level, ecological literacy also requires an ability to see the connections among personal behavior, personal health, and the health of natural systems. Ecological literacy requires a comprehension of environmental problems and the ability to distinguish between sustainable and unsustainable uses of nature. Finally – and perhaps most importantly – ecological literacy involves the ability to identify and generate solutions to environmental problems, and to help enact those solutions as citizens.

Given our limited time together, I do not expect you to become an expert on environmental issues as a result of taking this course. I do expect you to engage yourself with the essential background information and knowledge necessary to facilitate your own path to ecological literacy. I also aspire to give you a sense that our problems are solvable and that change is possible.

The first course module (3 weeks) is generally about environmental history and philosophy. We will discuss philosophies of land use – with particular focus on the recent concept of sustainability – as well as the roles of science in land use and conservation. Importantly, you will be introduced to what many people believe are the root causes of environmental problems (as opposed to symptoms of those problems). Without understanding the root causes of a problem, how can one expect to solve it? The second course module (5 weeks) is an introduction to basic principles in ecology, conservation biology, and earth science (primarily climate). The goal is to arm you with a basic understanding of how the world works. The third module (5 weeks) involves an introduction to our scientific understanding of major environmental problems, and the historical factors underlying those problems. Finally, we will end the course (2 weeks) by discussing potential solutions to environmental problems.

By the end of the course, you should be able to:

1.) Describe how humans - as animals - must use nature to survive
2.) Explain how the laws of thermodynamics place fundamental limits on our use of nature
3.) Compare and contrast ways in which people have distinguished between the use and abuse of nature
4.) Summarize ways in which sustainability has been defined
5.) List environmental problems that are the result of unsustainable human behavior, and explain
the root causes of environmental problems
6.) Explain core concepts in ecology, and summarize our ecological understanding of environmental problems
7.) Explain how human health is related to land health
8.) Summarize changes in design/architecture, economics, policy, and education that promote sustainability
9.) Articulate your own environmental ethic, and list actions to reduce your ecological footprint

Preparing for Lecture

I will post a webpage on the IB105 Moodle site specific to each lecture one week in advance. The webpage will include the following information:

1.) Required Pre-Lecture Activities

Pre-lecture activities will typically include short readings (essays, perspectives, news articles) and/or MasteringEnvironmentalScience online exercises. You will be required to take a short quiz on pre-lecture activities before coming to lecture (by 11:59 PM the night before lecture). The goal of these activities is to get you up to speed on basic concepts so that we can devote more in-class time to complex concepts and active learning exercises. All pre-lecture quizzes will be graded.

2.) Lecture Objectives

Lecture objectives include a list of goals that I believe you should be able reach by the end of lecture. These objectives will be used directly by me when constructing exams.

3.) Lecture Outline

The lecture outline includes the content to be covered during lecture. PowerPoint slides will only be posted on the course Moodle site after lecture is completed.

I will occasionally stop during lecture and have you complete an active learning activity, either individually or in a group. Examples of active learning exercises include the following: answering a series of questions throughout lecture, answering a clicker question, interpreting a figure, writing minute papers, discussing ideas in a small group, and answering practice exam questions. I will occasionally ask you to turn in a summary of active learning exercises to your TA for a grade. Make sure to bring your I-clicker to every lecture.

Lecture Hall Policies

Due to the large size of this class and lecture hall, I expect you to adhere to the following rules in order to minimize distractions to your classmates and me.

1.) Sitting in the balcony is prohibited. Seating will be restricted to the main floor.
2.) Do not maintain conversations with classmates during lecture. This is a distraction to other students and to me.
3.) Use of cell phones and MP3 players is prohibited. Computer use for note-taking is permitted, but I reserve the right to prohibit computer-use if it becomes a distraction.
4.) Late-arriving students will be expected to sit in a designated area in order to minimize disturbances during lecture.
5.) Do not start gathering your items to leave before 10:50 A.M., as it is a major distraction to your classmates and me.
6.) Clean up after yourself before you leave.

Grading Policy

Grades in this course will be based on the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Discussion</td>
<td>35%</td>
</tr>
<tr>
<td>Pre-Lecture Quizzes</td>
<td>6%</td>
</tr>
<tr>
<td>Active Learning Exercises</td>
<td>4%</td>
</tr>
<tr>
<td>Clicker Questions</td>
<td>3%</td>
</tr>
<tr>
<td>Online Surveys &amp; Assessment</td>
<td>2%</td>
</tr>
</tbody>
</table>

Grades will be assigned using the following point cutoffs:

- ≥ 93.0% = A
- 90.0-92.9% = A-
- 87.0-89.9% = B+
- 83.0-86.9% = B
- 80.0-82.9% = B-
- 77.0-79.9% = C+
- 73.0-76.9% = C
- 70.0-72.9% = C-
- 67.0-69.9% = D+
- 63.0-66.9% = D
- 60.0-62.9% = D-
- < 60.0% = F

Exams

Exams for this course will be a combination of multiple-choice, short-answer, and essay questions. Exams will cover lecture material, discussion material, reading assignments, and MasteringEnvironmentalScience online activities. Part of the final exam (~75%) will cover material since exam II, and part (~25%) will be comprehensive. Calculators, cell phones, MP3 players, and computers are not allowed during the exam. Requests to regrade questions must be submitted in writing to me within one week after exams are returned in class.

No make-up exams will be given for the two midterms. If you must miss an exam, you must notify me before the exam. Excused absences for exams include verified personal illness by a healthcare provider and tragedy in your immediate family. If you miss a midterm exam due to an excused absence, your grade for the exam will be prorated. Unexcused exam absences will be recorded as a zero. If the final exam is missed due to an excused absence, a makeup exam will
be administered at another time. I reserve the right to determine what constitutes an excused absence for an exam.

*Pre-lecture quizzes*
Pre-lecture quizzes need to be completed on the IB105 Moodle website before 11:59 P.M. the night before lecture. Pre-lecture quizzes will normally be posted after completion of the previous lecture. Quizzes will be worth 5 points each, and I will drop your lowest three scores.

*Active learning exercises*
Active learning exercises will be completed in many lectures. Exercises will often be written responses to discussion or questions in class. Exercises are worth 5 points each. While most exercises will be graded for completion only, I reserve the right to grade activities for correctness and effort. I will drop your lowest two scores.

*Clicker Questions*
Clicker questions will be used as an additional form of active learning. Answers to clicker questions throughout the term will count for 1 point each. I will drop your lowest two scores.

*Discussion*
Discussion sections will complement lectures by allowing students to read about, discuss, and “take sides” on current environmental issues, in both online and face-to-face formats. Material for discussion will come from essays, perspectives, as well as local, regional, and international news. Discussion points will be based on weekly participation, short written assignments, and presentations. Weekly discussions are worth 15 points each. One time during the semester, you will also address an environmental issue in the news through the use of online forum entries. The forum entries are worth 25 points.

Your lowest weekly discussion score will be dropped. Thus, excused absences for face-to-face sessions will be granted for illness or family emergencies only. Grades for excused absences will be prorated. If you are ill, you must 1) contact your TA prior to the missed discussion, and 2) provide a note from a healthcare provider verifying that you were seen by a doctor for your illness. If you have an unavoidable absence due to family emergencies, you must request permission to miss class from your TA prior to your absence. Your TA reserves the right to determine what constitutes an excused absence. There will be no excused or unexcused "absences" for online discussions. Failure to complete online activities will result in you receiving zero points for discussion.

*Online Surveys/Assessment*
You will complete both pre- and post-course assessments on the IB105 Moodle site. The assessments allow me to gauge your understanding of environmental issues before and after the course. You will receive credit simply for completing each assessment.
Course Policies

General
This course follows all policies in the UIUC Student Code (http://admin.illinois.edu/policy/code/).

Accommodations
If you require special accommodations, please see me as soon as possible. Accommodations will follow procedures stated in Article 1-110 of the UIUC Student Code (http://admin.illinois.edu/policy/code/article1_part1_1-110.html).

Honesty Policy
This course follows policies on academic integrity in Article 1, part 4 of the Student Code (http://admin.illinois.edu/policy/code/article1_part4_1-401.html) which states: “It is the responsibility of the student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions …” Any academic dishonesty will result in zero points for all parties for the first infraction. Second infractions will result in automatic failure of the course and a recommendation to the University for dismissal.
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<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Lecture Topic</th>
<th>Required Reading</th>
<th>Required Online Activity</th>
<th>Text Reading (Recommended)</th>
<th>Discussion Topic</th>
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<td>24-Aug</td>
<td>Course Overview</td>
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<td>Introductions</td>
</tr>
<tr>
<td>THUR</td>
<td>26-Aug</td>
<td>What is sustainability?</td>
<td><em>Book Chapter: Two, Measurments of Sustainability</em></td>
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<td>Sustainability</td>
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<td>TUES</td>
<td>31-Aug</td>
<td>Alternative Conservation Goals</td>
<td><em>Book Chapter: The Land, Ethic</em></td>
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<tr>
<td>THUR</td>
<td>2-Sep</td>
<td>Root Causes of Environmental Problems</td>
<td><em>Book Chapter: The Problem of Sustainability</em></td>
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<tr>
<td>TUES</td>
<td>7-Sep</td>
<td>Basic Scientific Principles</td>
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<td>THUR</td>
<td>9-Sep</td>
<td>Limits of Science</td>
<td><em>Book Chapter: Embracing Our Ignorance</em></td>
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<td>Environmental Ethics</td>
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<td>TUES</td>
<td>14-Sep</td>
<td>Introduction to Ecology &amp; Energy</td>
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<td>Ecological Footprint</td>
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<td>THUR</td>
<td>16-Sep</td>
<td>Ecosystem Structure and Climate</td>
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<td>TUES</td>
<td>21-Sep</td>
<td>Autocology and Adaptation</td>
<td><em>Mastering EnvSci</em></td>
<td>Ch. 1, pp. 12-16</td>
<td></td>
<td>Environmenta l Ethics</td>
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<td>THUR</td>
<td>23-Sep</td>
<td>EXAM I</td>
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<td>TUES</td>
<td>28-Sep</td>
<td>Ecosystem Ecology</td>
<td><em>Mastering EnvSci</em></td>
<td>Ch. 5.1-5.2, 3.5</td>
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<td>Ecosystems</td>
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<td>THUR</td>
<td>30-Sep</td>
<td>Ecosystem Services</td>
<td><em>Opinion: Give decision makers access to the value of nature’s services</em></td>
<td>Ch. 7, all</td>
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<td>TUES</td>
<td>5-Oct</td>
<td>Population Ecology</td>
<td><em>Mastering EnvSci</em></td>
<td>Ch. 4.1-4.2</td>
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<td>Ecosystem</td>
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<td>THUR</td>
<td>7-Oct</td>
<td>Human Population Growth</td>
<td><em>Mastering EnvSci</em></td>
<td>Ch. 8, all</td>
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<td>Value</td>
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<tr>
<td>TUES</td>
<td>12-Oct</td>
<td>Community Ecology</td>
<td><em>News: After a devastating fire, an intense study of its effects</em></td>
<td>Ch. 4.3, 4.5</td>
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<td>Human Population Growth</td>
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<td>THUR</td>
<td>14-Oct</td>
<td>Biodiversity</td>
<td><em>Opinion: Asian carp in Illinois - the problem, the solution</em></td>
<td>Ch. 6, all</td>
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<td>TUES</td>
<td>19-Oct</td>
<td>Food, Soil, and Agriculture I</td>
<td><em>Essay: The Agrarian Standard</em></td>
<td>Ch. 12, all</td>
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<td>Food &amp; Genetic Engineering</td>
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<tr>
<td>THUR</td>
<td>21-Oct</td>
<td>Food, Soil, and Agriculture II</td>
<td><em>Essay: Farmer in Chief</em></td>
<td><em>Mastering EnvSci</em></td>
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<tr>
<td>TUES</td>
<td>26-Oct</td>
<td>Water Resources &amp; Pollution</td>
<td><em>News: Clean water laws are neglected, at a cost of suffering</em></td>
<td>Ch. 10.1, 10.3-10.4</td>
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<td>Online Chat Review</td>
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<td>THUR</td>
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<td>EXAM II</td>
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<tr>
<td>TUES</td>
<td>2-Nov</td>
<td>Air Pollution</td>
<td><em>News: Sour showers: Acid rain returns - this time it is caused by nitrogen emissions</em></td>
<td>Ch. 19, all</td>
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<td>Water Distribution vs. Use</td>
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<td>THUR</td>
<td>4-Nov</td>
<td>Global Climate Change</td>
<td><em>Video: The Story of Cap and Trade</em></td>
<td>Ch. 18, all</td>
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<tr>
<td>TUES</td>
<td>9-Nov</td>
<td>Energy I</td>
<td><em>News: Fossil fuel’s hidden cost is in billions, study says</em></td>
<td>Ch. 14, all</td>
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<td>Global Climate Change</td>
</tr>
<tr>
<td>THUR</td>
<td>11-Nov</td>
<td>Energy II</td>
<td><em>Opinion: This time is different</em></td>
<td>Ch. 15.2-15.3, Ch. 16, all</td>
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<tr>
<td>TUES</td>
<td>16-Nov</td>
<td>Solid &amp; Hazardous Waste</td>
<td><em>News: Europe finds clean energy in trash, but U.S. lags</em></td>
<td>Ch. 21, all; Ch. 22.1-22.3</td>
<td></td>
<td>Energy</td>
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<td>THUR</td>
<td>18-Nov</td>
<td>Mechanisms for change: Ecological Design</td>
<td><em>Book Chapter: Designing Minds</em></td>
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<tr>
<td>TUES</td>
<td>23-Nov</td>
<td>FALL BREAK</td>
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<td>THUR</td>
<td>25-Nov</td>
<td>FALL BREAK</td>
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<tr>
<td>THUR</td>
<td>2-Dec</td>
<td>Mechanisms for change: Government &amp; Policy</td>
<td><em>Book Chapter: A Politics, Worthy of the Name</em></td>
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<td>TUES</td>
<td>7-Dec</td>
<td>Mechanisms for change: Environmental Leadership &amp; Education</td>
<td><em>Opinion: To really save the planet, stop going green</em></td>
<td><em>Opinion: Destined for failure</em></td>
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<td>Online Questionnaire</td>
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<tr>
<td>WED</td>
<td>15-Dec</td>
<td>FINAL EXAM - 8:00-11:00 A.M.</td>
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</table>