Comparative Ecosystems

GRG 366C, Fall 2012
Meets TTh 8AM in GRG 312
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(Office hours Tuesday 11 AM, or by appointment)

Description:
This course will survey the important ecosystem processes that affect the distributions, characteristics, and management of natural environments at landscape, regional, and continental scales. We will cover ecosystem functions including carbon dynamics, nutrient cycling, water balance, and the role of natural disturbances. This will be done by drawing examples and inspiration from a wide range of ecosystems, from the tundra to the rain forests and grasslands of the tropics. We will also evaluate the role of human impact in altering those environments, for farming or extractive practices, and we will search for appropriate management and conservation strategies for sustainable use.

Students are expected to have background in physical geography and/or ecology. This prerequisite is best accomplished by previously taking GRG 301C or its equivalent.

Required textbook:

Grading:
Two exams (vocabulary, short answer/ essay)—200 pts. (100 points each)
Seven in-class projects—70 points (10 points each)
One written essay, with in-class presentation—30 points
Final letter grades for the course are assigned by percentages of the 300 total possible points: >92%=A; 90-91.99%=A-; 88-89.99%=B+; 82-87.99=B; 80-81.99=B-; 78-79.99%=C+; 72-77.99%=C; 70-71.99%=C-; 68-69.99%=D+; 62-67.99%=D; 60-61.99%=D-; <60=F.

The exams are based on the assigned readings, the lectures, and the class discussions and projects. Note that the University of Texas at Austin provides upon request appropriate academic adjustments for qualified students with disabilities; for more information, contact the Office of the Dean of Students (471-6259, 471-4641).

There are two additional readings, in addition to the required textbook. These are available on Blackboard and consist of the Kofinas & Chapin and Smith et al. chapters (pp. 55-75 and pp. 171-195, respectively) in the 2009 book entitled *Principles of Ecosystem Stewardship* (Springer).

The final 30-point project is a three (or four) page essay based on Chapin et al. Chapter 15, and synthesizing ideas as needed from other materials covered in the course. The goal is to describe several ways of implementing adaptive management for an ecosystem type of your choice, including the research needs before implementation and policy implications of this kind of management. Make sure you briefly describe the ecosystem type you have chosen to focus on; pick one ecosystem type from those mentioned on pages 50 and 52 in the textbook. This essay is to be done independently and is due on the last day of class, along with a brief informal oral presentation of findings to the class. Cite any sources you use in the same manner as done in the Chapin et al. textbook. Note that this assignment replaces the final exam and so must show mastery of the topics covered in the semester.

**Course schedule:** Part 1. Landscapes: Change and Carbon (31 Aug.-11 Oct.); Part 2. Water, Nutrients, and Management (11 Oct.-6 Dec.)

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<tr>
<th>Dates</th>
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<tr>
<td>30 Aug.</td>
<td>Introduction</td>
<td></td>
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<tr>
<td>4, 6 Sept.</td>
<td>Ecosystem fundamentals</td>
<td>Chapin et al. 1</td>
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<td>11 Sept.</td>
<td>Landscape change; Forests</td>
<td>Chapin et al. 12, 13</td>
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<td>13 Sept.</td>
<td>Forests; <strong>Class project #1</strong></td>
<td>Kofinas &amp; Chapin reading</td>
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<td>18 Sept.</td>
<td>Landscape change; Grasslands</td>
<td>Chapin et al. 12, 13</td>
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<td>20, 25 Sept.</td>
<td>Carbon</td>
<td>Chapin et al. 5, 6</td>
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<td>27 Sept.</td>
<td>Vulnerability; <strong>Class project #2</strong></td>
<td>Kofinas &amp; Chapin reading</td>
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<td>2 Oct.</td>
<td>Decomposition; Energy</td>
<td>Chapin et al. 7, 10</td>
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4 Oct.                             Review
9 Oct.                             Exam #1
11 Oct.                            TBA
16 Oct.                            Water; Drylands     Chapin et al. 4
20 Oct.                            Drylands; **Class project #3** Smith et al. (2009)
23, 25 Oct.                        Nutrients           Chapin et al. 8, 9
30 Oct.,                           Climate; Soils; High elevations, latitudes Chapin et al. 2, 3
1 Nov.                             Climate; Soils       Chapin et al. 2, 3
6 Nov.                             Global change       Chapin et al. 14
8 Nov.                             Global change; **Class project #4** Smith et al. (2009)
13 Nov.                            Global change; agroecosystems Chapin et al. 14
15 Nov.                            Review
20 Nov.                            Exam #2
22 Nov.                            Thanksgiving
27 Nov.                            **Class project #5** Chapin et al. 15
29 Nov.                            **Class project #6** Chapin et al. 15
4 Dec.                             **Class project #7** Chapin et al. 15
6 Dec.                             Written project due, with brief in-class presentation