

Comparative Ecosystems

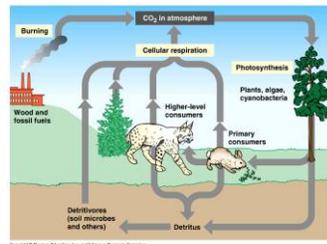
GRG 366C, Fall 2012

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:

Chapin, III, F.S, P. A. Matson & P. M. Vitousek. 2011. *Principles of Terrestrial Ecosystem Ecology*. Second edition. Springer, New York. ISBN: 978-1-4419-9502-5 (paperback).

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: $\geq 92\%$ =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).

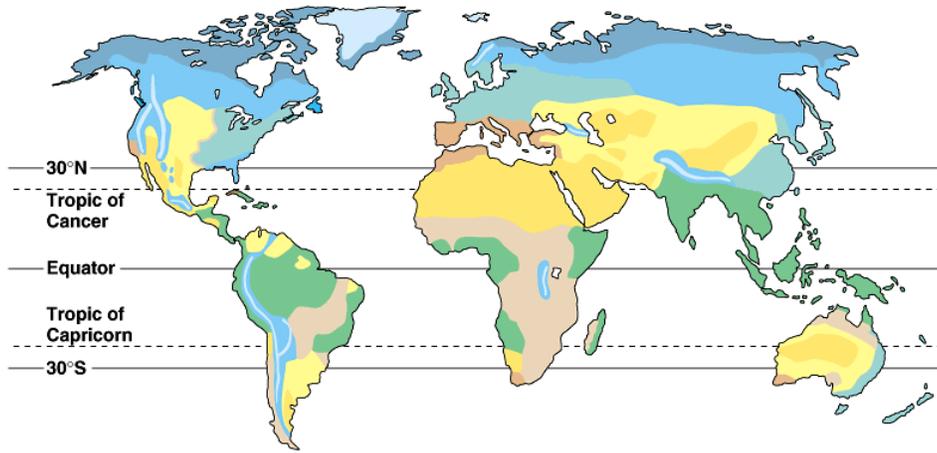
There are two additional readings, in addition to the required textbook. These are available on Blackboard and consist of the Kofinas & Chapin and Smith et al. chapters (pp. 55-75 and pp. 171-195, respectively) in the 2009 book entitled *Principles of Ecosystem Stewardship* (Springer).

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.)

<u>Dates</u>	<u>Topics</u>	<u>Readings</u>
30 Aug.	Introduction	
4, 6 Sept.	Ecosystem fundamentals	Chapin et al. 1
11 Sept.	Landscape change; Forests	Chapin et al. 12, 13
13 Sept.	Forests; Class project #1	Kofinas & Chapin reading
18 Sept.	Landscape change; Grasslands	Chapin et al. 12, 13
20, 25 Sept.	Carbon	Chapin et al. 5, 6
27 Sept.	Vulnerability; Class project #2	Kofinas & Chapin reading
2 Oct.	Decomposition; Energy	Chapin et al. 7, 10

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	



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| Tropical forest | Polar and high-mountain ice | Temperate deciduous forest |
| Savanna | Chaparral | Coniferous forest |
| Desert | Temperate grassland | Tundra (arctic and alpine) |

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