

# Syllabus

## Terrestrial Ecosystem and Climate Change Biology 596 Spring Semester, 2009

**Credit hours:** 3

**Meeting Location and Time:** LS-132, T-Th, 12:30-13:45

**Instructor:** Professor Chun-Ta Lai

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Office hours: By appointment

**Course Description:** This course will develop principles of ecosystem ecology and examine factors that control fluxes and stocks of elements (carbon, water and nutrients) within terrestrial ecosystems. Findings from recent research are given as examples to illustrate how ecosystems respond and feedback to climate change. Human-induced climate change will be discussed within the context of scientific evidence.

**Course Objectives:** After taking this course, students should be able to:

- explain basic concepts and principles of ecosystem ecology
- analyze the relationship between ecosystem organisms and environment: what are the factors that control cycling of elements in terrestrial ecosystems?
- understand interactions between biotic and abiotic (physical) processes: what are positive and negative feedbacks?
- differentiate natural and human-induced climate change
- give examples that demonstrate effects of climate change on Californian ecosystems
- apply the analytical skills learned from this course to dissect complex problems
- appreciate uncertainties associated with predicted ecosystem change
- enhance ability of critical thinking and learn how to effectively synthesize useful information

**Textbook:** *Principles of Terrestrial Ecosystem Ecology*, FS Chapin III, P Matson, H Mooney, Springer-Verlag, New York, 2002.

**Course Prerequisites:** Biol 201A, 201B, 354

**Course Outline** (tentative; final lecture topics are subject to minor changes)

Week	Date	Lecture Topic	Reading Chapter
1	1/22	Introduction to ecosystem concept	1
2	1/27	Climate – global patterns & variability	2
	1/29	Microclimate	2
3	2/3	Soil formation and properties	3

	2/5	Energy balance	4
4	2/10	Terrestrial water cycles/Plant water use	4
	2/12	Carbon I: Input to terrestrial ecosystems	5
5	2/17	Carbon II: Controls on production	5
	2/19	<b>Exam 1</b>	1-5
6	2/24	Carbon III: Controls on production (con't)	6
	2/26	Carbon IV: Ecosystem carbon balance	6
7	3/3	Decomposition I	7
	3/5	Decomposition II	7
8	3/10	Plant nutrient use I	8
	3/12	Plant nutrient use II	8
9	3/17	Nutrient cycling I	9
	3/19	Nutrient cycling II	9
10	3/24	<b>Exam 2</b>	6-9
	3/26	Guest lecture: Dr. Sharon Herzka, TBA	
11		Spring break, no classes	
12	4/7	Ecosystem tools: Stable isotopes I	handout
	4/9	Ecosystem tools: Stable isotopes II	handout
13	4/14	Global Climate Change	handout
	4/16	Trophic dynamics	11
14	4/21	Species and community effects	12
	4/23	Temporal variability	13
15	4/28	Global biogeochemical cycles	15
	4/30	<b>Exam 3</b>	11-15
16	5/5	Final project – PowerPoint presentation	
	5/7	Final project – PowerPoint presentation	
17	5/12	Final project – PowerPoint presentation	

### Grading

Grading will be based on performances on in-class assignments, three midterm examinations and one final project. Midterm exam questions will come from lecture materials and textbook reading. Exams will be 75 min long, and take place in the lecture room (LS 132). Each exam will cover material presented since the previous exam. Exam questions may require quantitative and analytical analyses taught in lectures. Students will be asked to prepare a final project that includes a 15-min group presentation and a written term paper based on their choices of selected topics. The total points earned determine your final grade, according to the breakdown of points below:

1. Examination 1 (100 pts, 20%)
2. Examination 2 (100 pts, 20%)
3. Examination 3 (100 pts, 20%)
4. Final project (total 150 pts, 30%): including a summary (25 pts), a PowerPoint presentation (75 pts) and a 2-page written paper (50 pts).
5. In-class participation & assignments (50 pts, 10%)

Grading scale (out of a total 500 pts)

A	(> 465 pts)	C+	(385-399 pts)
A-	(450-465 pts)	C	(365-384 pts)
B+	(435-449 pts)	C-	(350-364 pts)
B	(415-434 pts)	D	(300-349 pts)
B-	(400-414 pts)	F	(< 300 pts)

Graduate students grades will reflect higher standards for written papers and class presentations.

**Course materials:** Blackboard (<http://blackboard.sdsu.edu/>) will be used for electronic posting of lecture outlines, grades and other materials, including this syllabus. Course announcements will be made during lectures, by emails or on Blackboard, whichever is most convenient.

**Lecture attendance:** Lecture attendance is strongly encouraged! You need to come to the class for lecture notes, which will help you learn and prepare for exams. *Note that lecture outlines posted on the Blackboard are not lecture notes.* Come to the class, join the discussion, and you may be surprised at your own creative thinking!

**Office hours:** I have set aside four hours each week to meet with individuals to discuss questions related to classroom materials or anything else. Students are encouraged to take advantage of the office hours – I am here to help you learn!

**Missing exam policy:** Only medical emergency will be allowed to take a make-up exam after the actual exam date. Other conflicts need to be arranged in advance to take the exam BEFORE the actual exam date. To document an excusable absence, you must provide evidence that your absence was the result of a serious, unavoidable problem. Make-up exams will only consist of short-answer questions (no multiple-choice questions), which often require more elaborated explanation in your answers.

**Regrade request policy:** Questions regarding grading will be considered only if your request is received within one week of the day on which test results are returned to you.

**Reading:** For most effective learning you should read the assigned chapter from the textbook before each lecture. I will cover the topics in the textbook as much as possible including those that are very important but only briefly introduced in the textbook.

**Final project and presentation:** Students are requested to participate in one group presentation. Group presentation should focus on topics taught in this course that also has broad interests to the general public. PowerPoint presentation will take place during the lecture meeting times. Students will work as a group for a selected topic but each student must present to the class during a 15-minute period, including 5 minutes for questions and discussion. Groups will want to review and synthesize information from recent articles in scientific journals, newspapers and magazines to give an informative presentation and lead discussions on the selected topic. Presentations should be based

upon information from reliable sources with correct citation. I expect students to give appropriate credits to ideas from others (group members, published articles and textbooks).

Each individual will require submitting a two-page written paper plus a summary of less than 300 words as part of the final project. Final written papers should be submitted in PDF format (preferred via emails) and received by May 18, 2009. Submission after deadline will not be accepted.

**Student responsibilities:** Please review the syllabus carefully regarding course content and grading policies if you decide to take this course. Students should always confirm with me for any electronic submissions of course assignments. It is student responsibility to assure an electronic submission has been received by me. Students are expected to maintain professional behavior in the classroom setting according to the Standards for Student Conduct specified in the California Code of Regulations. Cheating is rarely an issue in ecology courses; however, please note that **University regulations concerning plagiarism and cheating will be strictly enforced.**

**Dropping:** If you decide this is not the course you want to take, the last day to drop is February 11, 2009.