Syllabus

Terrestrial Ecosystem Science Lab
Biology 596L
Spring Semester, 2009

Credit hours: 2
Maximum number of enrollment: 20
Meeting Location and Time: LS-235, 1400-1540 Th
Instructor: Professor Chun-Ta Lai
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Phone: 619-594-0678
Office hours: by appointment

Course Description: This course is meant to be taken in conjunction with the 'Terrestrial Ecosystem and Climate Change' lecture course. Ecological methods used in ecosystem and climate change science will be introduced and conducted. Analytical approach includes chemical analysis and meteorological measurements. Chemical analysis will focus on stable isotope ratio and elemental determination using instruments in the Ecological Analytical Facility. Data analyses, including modeling, and presentations will be required to interpret experimental results. There will be field trips for sample collection and possible visits to local research institute/facility to promote the awareness of global change research.

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

- be familiar with the analytical skills learns in this course
- collect ecological samples and know proper storage for laboratory analysis
- apply analytical skills learned from this course in thesis projects
- explain principles of instrument operation and function
- independently form and test hypothesis of science
- diagnose measurement errors and avoid misinterpretation of data
- present experimental data in a logical manner
- appreciate uncertainties associated with model forecast
- understand laboratory safety to prevent injury
- enhance ability of critical thinking and learn how to effectively synthesize useful information

Textbook: *Methods in Ecosystem Science*, OE Sala, RB Jackson, HA Mooney, RW Howarth, Springer-Verlag, New York, 2000.

Course Prerequisites: Biol 291, 596 (or concurrently enroll)

Course elements and organization
The course will begin with an introduction to explain laboratory guidelines, safety issues and methods to be used. Lab activities are structured around 4 study themes. Each theme requires 3 weeks of participation and begins with an introduction of methods and objectives. Students will work in a team format by first selecting a study target (flora, fauna or ecosystem), followed by collecting, preparing and analyzing samples as a group. In the third week each individual presents results to the class and returns a written report following the presentation.

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

Week	Date	Topic
1	1/22	**Introduction – Lab safety, general guidelines, methods and expectations**
2	1/29	**Theme 1: Micrometeorology** Measurements and instruments
3	2/5	Weather data collection and analysis
4	2/12	Presentation and report due
5	2/19	**Theme 2: Photosynthetic pathways** Stable carbon and nitrogen isotope methods
6	2/26	Sample collection and preparation
7	3/5	Presentation and report due
8	3/12	**Theme 3: Trophic linkage** Stable carbon and nitrogen isotope methods
9	3/19	Sample collection and preparation
10	3/26	Presentation and report due
11	4/9	Field trip to San Diego Natural History Museum
12	4/16	**Theme 4: Plant water relation & water quality** Stable oxygen and hydrogen isotope methods & heavy metal analysis
13	4/23	Sample collection and preparation
14	4/30	Presentation and report due
15	5/7	Field trip to Scripps Institute of Oceanography

Project presentation and report: Every student is required to participate in group presentation. Presentation should be given with PowerPoint to report experimental results and conclude a study theme. Each student must present to the class during a 15-minute period, including 5 minutes for questions and discussion. Presentations should begin with a hypothesis, demonstrate results, major findings, and discuss potential errors/difficulties encountered during the experiment. I expect students to give appropriate credits to ideas from others (group members, published articles and textbooks). **Use citations!**

Each individual will require submitting a two-page written report for each study theme. All written assignments should be typed/word-processed, 12 pt. font, 1” margins, and double-spaced, with each page numbered. Written reports should be submitted in PDF format (preferred via emails) and received on the day of presentation. **Submission after deadline will not be accepted.**

Grading
Student performance will be primarily evaluated on individual contributions to team projects: students in teams will design experiment, collect samples, analyze results, report those results to the rest of the class in both written and oral form, and receive feedback from peers and the instructor. 4-5 students are expected to form a team. A lab worksheet will be used to encourage in-class participation and aid evaluation.

The total points earned determine your final grade, according to the breakdown of points below:

1. Presentation (50 x 4 = 200 pts, 40%)
2. Written report (50 x 4 = 200 pts, 40%)
3. Lab Worksheet (25 x 4 = 100 pts, 20%)

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)

Attendance and participation: A considerable portion of the course will involve projects done by small groups of students and individuals. Depending on the nature of each project, students may need to schedule blocks of **out-of-class time** to prepare experimental setups, make observations, and conduct data analysis. Later on, some lab periods will be freed up to allow time for your course projects.

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**.