

Syllabus

Seminar: Stable Isotope Ecology
Biology 688
Spring Semester, 2009

Credit hours: 2

Maximum number of enrollment: 20

Meeting Location and Time: LS-132, 1300-1450 M

Instructor: Professor Chun-Ta Lai

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Phone: 619-594-0678

Office hours: By appointment

Course Description: Survey recent literature on applications of stable isotope ratio method in ecological and global change science. Study topics include plant-water relations, plant and ecosystem carbon sequestration, global carbon balance, trophic dynamics and foodweb analysis, hydrology, sources and origins of trace gas production, climate change, paleoclimatology, stable isotope modeling and uncertainty analysis.

Course Objectives: Students will make presentations and lead discussions on assigned readings. After taking this course, students should be able to:

- be familiar with primary literatures in stable isotope ecology
- understand principles and rationale of stable isotope ratio technique
- design experiments for stable isotope data collection
- interpret ecological pattern and trend from stable isotope ratio data
- appreciate uncertainties associated with stable isotope data analysis
- apply knowledge learned from this course in thesis projects
- present experimental data in a logical manner
- enhance ability of critical thinking and learn how to effectively synthesize useful information

Course Materials: All course materials will be posted on the Blackboard (Bb). Assigned readings will be posted at least two weeks in advance. I will provide supplemental reading materials if necessary and post an announcement on Bb.

Course Prerequisites: It is strongly recommended that students have had some advance ecology courses in plant physiology, ecosystem ecology, global change and animal ecology or are taking it concurrently. Previous experiences of applying stable isotope ratio technique would be favorable.

Course elements and organization

The course will begin with an introduction by the instructor to explain principles and methods for determining stable isotope ratios of ecological samples. There are two

student presentations each week. Each student has 50 minutes; with 25 minutes for presentation, 20 minutes for questions and discussions and 5 minutes for other in-class activities. The course is structured around 6 study themes. **A list of suggested readings will be provided and posted on the Bb at the beginning of the semester.** Students are encouraged to present results from their own thesis research, but can choose to present articles from primary literatures.

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

Week	Date	Topic
1	1/26	Introduction – Principles of stable isotopes in Ecology Method and instrumentation
2	2/2	Theme 1.1: Carbon balance in plants Readings: TBA
3	2/9	Theme 1.2: Carbon balance in ecosystems Readings: TBA
4	2/16	Theme 2.1: Global hydrological cycle Readings: TBA
5	2/23	Theme 2.2: Ecohydrology Readings: TBA
6	3/2	Theme 3.1: Trophic linkage Readings: TBA
7	3/9	Theme 3.2: Animal movement Readings: TBA
8	3/16	Theme 3.3: Food webs in aquatic systems I Readings: TBA
9	3/23	Theme 3.3: Food webs in aquatic systems II Readings: TBA
10		Spring break, no classes
11	4/6	Theme 4.1: Climate change Readings: TBA
12	4/13	Theme 4.2: Paleoclimatology Readings: TBA
13	4/20	Field trip to Scripps Institution of Oceanography
14	4/27	Theme 5: Sources of trace gas production Readings: TBA
15	5/4	Theme 6: Stable isotope modeling Readings: TBA
16	5/11	Other applications Readings: TBA

Project presentation and report: Every student is required to give **two PowerPoint** presentations on papers of selected topics and lead discussions in class. Presentations should begin with an overview of the study question, and include an introduction/background of the subject, a description of the (analytical, statistical or modeling) methods used by the authors, major findings and the significance of its contributions to the field. I expect students to give appropriate credits to ideas from others (published articles and textbooks). **See the ‘suggested reading list’ for the requirement of additional citations. Students must turn in their PowerPoint presentation after the class.**

Grading

Student performance will be primarily evaluated on individual contributions to course objectives. The total points earned determine your final grade, according to the breakdown of points below:

1. Presentation (must also submit presentation in PowerPoint, 60%)
2. Participation in discussion (includes written questions, 40%)

Late assignment policy: Absence of presentation or late submission of written report is allowed ONLY if proofs of medical emergency are provided. Other conflicts need to be arranged in advance BEFORE due date. To document an excusable absence, you must provide evidence that your absence was the result of a serious, unavoidable problem.

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.**