Catalog Description:

This course will teach students a broad range of techniques and tools used to collect data in field ecology. Students will learn various methods employed in research on animal populations in terrestrial habitats. Topics covered will include: animal census techniques; capture and marking, including radio telemetry; habitat assessment; observation of behavior; experimental manipulation of behavior; design and logistics of field experiments.

Other Prerequisites

The suggested prerequisite course is Biosci 130. This methods course builds upon your knowledge of ecology and animal behavior. Therefore some basic understanding of these topics will be expected. I will bring to class my own personal experiences using a variety of field techniques.

What You Will Need to Purchase for this Course

Textbooks: (available (used copies also) through the Kennel bookstore)

Ecological Methodology, Second Edition
Author: Charles J. Krebs

Other recommended books include the following field guides:

A Field Guide to Western Reptiles and Amphibians (Peterson Field Guide Series)
Authors: Robert C. Stebbins, Roger T. Peterson
Price: $22.00 (Amazon Price: $15.40)

National Geographic Field Guide To The Birds Of North America, 4th Edition
National Geographic Society
Price: $21.95 (Amazon Price: $15.37)
Authors: John O. Whitaker Jr.

Authors: William H. Burt, Richard Philip Grossenheider, Roger Tory Peterson

These books will serve you well over the years if you maintain even a casual interest in observing wildlife and nature – and I hope you will after this class. If you are unable to purchase your own copy, I will have one available for use during the field trips.

This course is also web-enabled so I will make additional material available on Blackboard. Please make sure to use that site frequently.

Other requirements: A decent pair of binoculars will be required for the field trips and exercises. If you do not have your own, you may borrow a pair for use during the semester from me. Please wear clothing appropriate for ecological fieldwork – with adequate protection from the sun, thorny plants, insects, and other joys of nature. Also, avoid bright colors as they may scare off our study subjects.

Assessment

Examinations: there will be one midterm exam and a final (100 points each), addressing the theoretical aspects of field methods.

Field Project Reports & Presentations: There will be 4 field projects involving original data collection, analysis and interpretation. For one of these, you will be required to submit a full written paper, in appropriate scientific format, on these projects. For a second one, you will prepare a poster presenting your work. And for the third one, you will prepare and present a formal oral presentation as you would for a scientific meeting. Worth 100 points each.

Field notebook: You will be required to keep a field notebook. This will be handed in at the end of the semester, and should include: field observations, including descriptions of sites and taxa observed, notes for your field projects, as well as other thoughts and observations. Worth 50 points.

Grading: I do not usually adjust grades to a curve: you earn points and are graded accordingly. If you miss either exam, you may take a make-up exam; you must provide a written excuse for missing an examination.

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<tr>
<th>EXAM</th>
<th>POINTS</th>
<th>DATES (tentative)</th>
<th>GRADE CUTOFFS</th>
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</thead>
<tbody>
<tr>
<td>Midterm</td>
<td>100</td>
<td>Tue, 15 March</td>
<td>A = &gt;85%</td>
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<tr>
<td>Final</td>
<td>100</td>
<td>Tue 16 May</td>
<td>B = 75 - 84.49%</td>
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<tr>
<td>Field Project (3)</td>
<td>100</td>
<td>TBA</td>
<td>C = 65 - 74.49%</td>
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<tr>
<td>Field notebook</td>
<td>50</td>
<td>Hand in May 10</td>
<td>D = 50 - 64.49%</td>
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<tr>
<td>Total</td>
<td>550</td>
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<td>F = &lt;50%</td>
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Subject to Change

This syllabus and schedule are subject to change in the event of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while you were absent.

Course Policies & Safety Issues

If you are going to come to class, please come on time. If you can’t make it till half way through class, don’t come. It is disruptive to the learning of your fellow students to have a chain of latecomers. Generally, I will not take roll: this is your education, so if you choose not to come to class that is your choice. If you miss a class, you may consult fellow students for notes; please do not expect me to do the entire lecture a second time during office hours, although I can help you catch up if you miss something substantial for valid reasons. I like to stimulate intellectual exchange as a part of the learning process, and therefore encourage collaboration among students. In that spirit, you are welcome to come to office hours as a group to discuss / debate / argue any topic at least tangentially relevant to the course. You may team up with one or two others for some of the lab/field exercises, and can work together on assignments. At the same time, you are individually responsible for your learning, and will be tested individually. All written assignments must therefore be written individually.

Since both lecture and laboratory sessions meet in a computer lab, no food or drink is allowed, with the possible exception of bottled water. Plenty of water, and some food are encouraged for the field trips, however! Since you will be sitting in front of a computer, please refrain from web-surfing or other computer activity during lecture! If you have electronic communication devices including cell phones, beepers, pagers, Palm Pilots, computerized watches, iPods, or whatever the next technological innovation is, TURN THEM OFF in class; some of these things may be useful in the field. If you need to bring a visitor to class/field, please see me in advance.

Field Visits: There will be several field trips as part of the laboratory component of the course. You will be notified in advance of the dates and locations. If available, we will use a University vehicle to car-pool. In case an official vehicle is not available, we may car pool with our own cars.

Copyright: You will be provided with digital and/or print materials to support your learning in this course. As all of these materials are proprietary in nature, and most are protected by copyright, you may not reproduce or retain any of the materials for purposes other than class work.

University Policies

I support wholeheartedly the university’s policies, including, but not limited to, the following:

Students with Disabilities: Upon identifying themselves to the instructor and the university, students with disabilities will receive reasonable accommodation for
learning and evaluation. For more information, contact Services to Students with Disabilities (http://studentaffairs.csufresno.edu/ssd/) in Madden Library 1049 (278-2811).

**Cheating and Plagiarism:** "Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term 'cheating' not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means. Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one's own work." Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an F for the course, to expulsion from the university. For more information on the University's policy regarding cheating and plagiarism, refer to the Schedule of Courses (Legal Notices on Cheating and Plagiarism) or the University Catalog (Policies and Regulations).

**Computers:** "At California State University, Fresno, computers and communications links to remote resources are recognized as being integral to the education and research experience. Every student is required to have his/her own computer or have other personal access to a workstation (including a modem and a printer) with all the recommended software. The minimum and recommended standards for the workstations and software, which may vary by academic major, are updated periodically and are available from Information Technology Services (http://www.csufresno.edu/ITS/) or the University Bookstore. In the curriculum and class assignments, students are presumed to have 24-hour access to a computer workstation and the necessary communication links to the University's information resources."

**Disruptive Classroom Behavior:** "The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. ... Differences of viewpoint or concerns should be expressed in terms which are supportive of the learning process, creating an environment in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop and understanding of the community in which they live . . . Student conduct which disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class."
Course Goals and Primary Learning Outcomes

This course provides a broad survey and overview of field methods used in the area of animal ecology. The course emphasizes techniques used in terrestrial habitat to measure a variety of ecological variables and to estimate important parameters such as population density, species distribution, community composition, species diversity, home range use by individuals, and aspects of habitat structure and composition. The design of the course is based on the following core elements:

1) Scientific method. The primary emphasis is on the formulation of clear hypotheses with testable predictions—using appropriate conceptual models to help identify the principal variables, and clarify the relationships among them.

2) Quantitative techniques. The course covers the necessary statistical background for sampling and experimental design in field research. It also introduces some advanced statistical techniques for multivariate and spatial analyses that are essential for studying complex ecological interactions.

3) Hands-on research. The course uses an interactive and experiential approach where students learn the methods by incorporating them in their own research projects in the field. Student field projects are chosen to allow them to employ a range of techniques to address interesting ecological and behavioral questions.

By the end of this course, successful students will be able to:

- Census vertebrate populations
- Map distributions of animals
- Assess habitat quality
- Observe and document animal behavior in the wild
- Track animals fitted with radio-transmitters
- Formulate hypotheses about mechanisms that generate observed ecological patterns
- Conceptualize potential experimental tests of such hypotheses
- Design field ecological experiments
- And collect other related field data

A primary goal of science education is to empower individuals to think critically in acquiring knowledge about the world around them, and in applying it to their work and daily lives. This course encourages students to think carefully about ecological patterns and processes, formulate hypotheses, and test them as well as their own assumptions/preconceptions, in order to generate new insight and understanding. The course therefore aims to provide a strong foundation of methodological and critical skills in ecology, to help prepare students for graduate school or careers in environmental agencies. The complex nature of ecological interactions, and the magnitude of our environmental problems, makes developing such skills critical to all practitioners in the environmental arena: ecologists, environmental policy makers and managers, as well as non-professionals.