**RESTORATION ECOLOGY ENVS 151/BIOL 151**

**Instructor** Dr. Virginia Matzek

**Office** 217 Varsi Hall

**Office Hours**  M 1-2 pm, F 2-3 pm, or by appointment

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**Course Description**

The science and practice of restoring degraded ecosystems, with an emphasis on plant ecology. Through field trips to restoration projects and examination of case studies from the literature, students will grapple with basic questions: How do we decide what to restore? How do we restore it? And how do we know if we're finished? Emphasis on reading and writing scientific papers, understanding data analysis, and critically judging the success of restoration projects in meeting goals of biodiversity and ecosystem function.

**Course goals**

1. Students will understand the major scientific and management challenges to successful ecological restoration of degraded areas, with an emphasis on Bay Area issues.

2. Students will feel comfortable reading, summarizing, and critically reviewing experimental studies from the peer-reviewed scientific literature.

3. Students will collect field data and perform lab analyses relevant to current practice in the field of ecological restoration

4. Students will gain familiarity with local natural history and will be able to identify common plants and animals, and species of conservation interest, in area habitats.

5. Students will write and give oral presentations in formats relevant to regulatory and management audiences.

6. Students will reflect on the value of scientific evidence to restoration and monitoring, as well as the underlying philosophy of intervention in restoration projects.

7. Students will act as independent learners as well as teachers, seeking out information and contributing it to the class’s fund of knowledge.

**Department learning objectives**

***Natural science:* Students can explain key principles of ecology, evolution, geology, and chemistry, and articulate natural science dimensions of sustainability.**

***Critical thinking:* Students can** identify which methodological tools & quantitative/ qualitative skills are appropriate to address particular environmental questions; students can assess the quality of different types of evidence and understand the role that uncertainty and risk play in environmental decision making.

*Communication:* Students can communicate effectively, both orally and in writing, to diverse audiences on environmental subjects and research.

**Course policies**

*Academic integrity:* All work turned in under a student’s name must be entirely and totally the original work of that student. Except on group projects where team work is expressly encouraged, collaboration with other students to produce graded work is against my policy, and all collaborating students receive a zero grade. Cheating, plagiarism, data fakery, and other forms of academic dishonesty are punished according to my judgment of the seriousness of the offense, up to and including failure of the course.

*Assignments*: Detailed expectations for assignments will be posted on Camino. Unless announced otherwise, all homework is due *in class*, typed, on paper, folded lengthwise down the middle with your last name written on the outside. Handwritten assignments get zero unless I have expressly permitted handwriting in advance; the same goes for assignments turned in by e-mail.

*Attendance:* Lab attendance is mandatory**. Lecture attendance is mandatory on guest speaker days and student presentation days**, and highly recommended at all other times.

*Disability accommodation:* To request academic accommodations for a disability, students should contact Disability Resources in Benson 216, 408-554-4109. Students must provide documentation of a disability prior to receiving accommodations.

*Distractions:* Cell phones, laptops, tablets, and other devices with potential to distract must be turned off and out of sight during class and during field trips.

*Late work:* Late assignments suffer a -30% penalty, starting at the end of class on the due date. No late assignment may be turned in by e-mail, nor will I accept them more than 1 week after the original due date.

*Readings*: Readings are assigned via Camino. Each set of readings is listed in the syllabus as a “reading package” (RP) that should be read by a particular date. Typical readings include peer-reviewed scientific papers, restoration planning documents, lab protocols, and book chapters. There is no required textbook. Quiz Prep packages are images and text that you should study to prepare for quizzes.

**Course Grading**

The grading scale for final grades is as follows: A = (93-100%), A- = (90-92%), B+ = (87-89%), B = (83-86%), B-=(80-82%), C+ = (77-79%), C = (73-76%), C-=(70-72%), D+ = (67-69%), D = (63-66%), D- = (60-62%), and F is 59 or below. A grade of “Incomplete” will be issued to a student who does not complete the following requirements: group seminar, exams, attendance at all student presentations, and attendance at all labs.

**Assignments**

Group seminars: In groups of 3, students will choose a topic, identify and review the published literature on it, and prepare a seminar lasting a whole class period, including lecture slides, discussion questions, and a handout. Each student should expect to cover two individual peer-reviewed journal articles for the seminar, in addition to contributing to the topic overview. Students will receive a grade that combines their individual contribution to the seminar, the whole-group performance on the assignment, and an anonymous peer rating of their level of participation in the group work. (20%)

Quizzes/Homework: One of the objects of this class is to improve the student’s skills at animal and plant identification; quizzes will be based on images posted on Camino of species that we might see on a field trip. To make up a quiz, the student must have an excused absence, arranged in advance or backed by a doctor’s note if due to illness. Another skill is in reading and understanding the peer-reviewed scientific literature. Homework assignments require the student to summarize and critique a paper on the topic of the lecture. (15%)

Field notebook: students will keep a field notebook to record notes and data from field trips. For full credit, the notebook must be brought to each lab session. (10%)

Wetlands Delineation practical exam: This exam will cover soil, vegetation, sampling regime, and regulatory aspects of wetlands delineation. (15%)

Final exam: The final exam will will cover all material from the lectures, labs, readings, quiz images, and the student presentations and handouts. (30%)

Volunteer shift: Students are required to put in at least one half-day or full-day volunteer shift at a local habitat restoration project. A list of regular volunteer opportunities is included in the assignment sheet, but other projects may qualify (see requirements on the assignment sheet). To get approval for an alternative, students must e-mail me the name of the project and the name and contact information for the volunteer coordinator at least by WEDNESDAY before the intended volunteer date. The completed writing assignment will include a photograph of the student at the restoration site and will be due before the final exam. Another alternative this year is that students may attend an all-day SERCAL field trip in Marin County on May 13 by signing up during the first week of classes. (10%)

IMPORTANT! Bird banding must take place in the morning when the birds are out. Therefore, the May 14 afternoon labs will be replaced by our bird banding demo at the Coyote Creek riparian restoration. (You can spend that afternoon reviewing the wildlife cam data if you wish.) Attendance at this morning lab, like all labs, is mandatory, so please notify your other instructors immediately if you have class at that time, so that you can drop this course if you are unable to resolve the conflict.

SCHEDULE (topics subject to change; due dates will remain fixed)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Class | Topic | Read by today | Due today |
| 3/31 | LEC | Intro/Logistics/Student vote on topics |  |  |
| 4/2 | LEC | Ecology Review part 1 |  |  |
|  | LAB | Scientific papers/Field notes workshop |  | One journal article on your seminar topic (print out) |
| 4/4 | LEC | Ecology Review part 2 |  |  |
| 4/7 | LEC | Freshwater Wetlands and CWA 404 | RP#1 |  |
| 4/9 | LEC | Wetlands delineation Intro | RP#2 |  |
|  | LAB | Wetlands delineation Lab #1 |  |  |
| 4/11 | LEC | Vegetation monitoring |  | Wetland summary |
| 4/14 | LEC | Historical ecology and Restoration Planning | RP#3 |  |
| 4/16 | LEC | Wetlands delineation Conclusion | QuizPrep #1 | Wetland plant quiz |
|  | LAB | Wetlands delineation Lab #2 |  |  |
| 4/18 | LEC | **Good Friday holiday: NO CLASS** |  |  |
| 4/21 | LEC | Dam removal and riparian restoration | RP#4 |  |
| 4/23 | LEC | Guest Lecturer: Philippe Cohen (Searsville) |  | Dam summary |
|  | LAB | Searsville Dam Removal field trip |  |  |
|  4/25 | LEC | Wetlands delineation exam |  |  |
| 4/28 | LEC | Animal reintroduction | RP#5 |  |
| 4/30 | LEC | Animal survey methods  | QuizPrep #2 | Animal ID quiz |
|  | LAB | Arastradero field trip—camera trap install |  |  |
|  5/2 | LEC | Calif. grasslands and oak savannahs | RP#5 |  |
| 5/5 | LEC | Restoration and global change |  | Grassland summary |
| 5/7 | LEC | Serpentine N availability method | QuizPrep #3 | Serpentine ID quiz |
|  | LAB | Rancho Cañada del Oro field trip |  |  |
|  5/9 | LEC | Student research presentations: 1 |  |  |
| 5/12 | LEC | Student research presentations: 2 |  |  |
| 5/13 |  | SERCAL field trips (optional) |  |  |
| 5/14 |  LEC | Student research presentations: 3 |  |  |
|   | LAB | MORNING LAB: 8-10 AM BIRD BANDING; AFTERNOON: WILDLIFE CAM (on Camino) |  |  |
| 5/16 | LEC | **VM @ SCI: NO CLASS** |  |  |
| 5/19 | LEC | Student research presentations: 4 |  |  |
| 5/21 | LEC | Student research presentations: 5 |  |  |
|   | LAB | N min followup (in lab) | RP#6 |  |
| 5/23 | LEC | Genetic issues in restoration | RP#7 |  |
| 5/26 | LEC | **Memorial Day holiday: NO CLASS** |  |  |
| 5/28 | LEC | Dunes and barrier islands | QuizPrep #4 | Dune ID quiz |
|  | LAB | Half Moon Bay dunes field trip |  |  |
|  5/30 | LEC | Rethinking the Interventionist Philosophy | RP#8 |  |
| 6/2 | LEC | Class debate: Novel Ecosystems or Adaptive Introgression (student choice) |  |  |
| 6/4 | LEC | South Bay Salt Pond restoration | QuizPrep #5 | Salt marsh ID quiz |
|  | LAB | Salt pond field trip |  |  |
| 6/6 | LEC | Catchup & exam review |  |  |
| 6/9 |  | Final Exam 9:10 am to 12:10 pm |  |  |