

## **Syllabus: ESM 212, Biological Community Survey and Analysis (Sunday 3/24 – Friday, 3/29)**

**Instructor: Dr. Andy MacDonald**

This spring break intensive course will introduce students to the principles and practice of designing and executing field sampling campaigns to characterize, map, and inventory plant and animal communities. The course will review basic sampling theory, introduce survey methods for terrestrial vegetation, terrestrial vertebrates and invertebrates, as well as aquatic invertebrates. Students will gain experience with multivariate analysis of community data, as well as methods for vegetation and species habitat mapping and modeling. Learning objectives and activities will be primarily field-based, and will take place at UCSB's Sedgwick and Coal Oil Point Reserves.

Readings for the course will be posted to complement lecture material, as well as for further reference to case studies and methods discussed. In addition, there will be four assignments posted, three that will be based on field sampling data collected during the week, and a fourth centered on student presentations of case studies of biological surveying/monitoring programs. Grades will be based on the following rubric:

- Assignments 1-3: 10 points each (30 points total)
- Assignment 4: 20 points
- Full participation in each day's activities including lectures and field exercises: 25 points each day (150 points total)
- Total points for the course: 200

We will meet at Bren at 8am each morning unless instructed otherwise for specific activities. We will take UCSB vans out to field locations from Bren and return to campus in the evening. Each day, students should bring with them the following items: sturdy hiking boots, long pants, sunscreen, hat and sunglasses, water, snacks (including lunches and enough food in case we return from the field late), notebooks and pens, and any field guides or gear you have (e.g., binoculars, field guide to plants, etc.).

Daily schedule of activities:

**Sunday (3/24): Sedgwick**

- Lecture – Overview and basics of sampling design
- Late morning: set camera traps
- Lunch Lecture: vegetation sampling theory and methods
- Field (afternoon) – sampling of herbaceous vegetation (modified Whittaker plots)
- Assignment 1 (late afternoon work time and discussion) – Making sense of plant community sample data (diversity and dissimilarity)

**Monday (3/25): Sedgwick**

- Lecture – Analysis of community survey data and forest monitoring
- Field (late morning to afternoon) – measuring woody plants (dbh, stem density, canopy cover, etc.)

- Assignment 2 (afternoon work time and discussion) – estimating forest carbon in Sedgwick’s oak woodlands

Tuesday (3/26): Coal Oil Point

- Field (8am – 12:30pm) – simulate breeding bird survey methods with Armando Aispuro (COPR)
- Afternoon Lecture – Animal survey methods and population size estimation/mark-recapture
- Field (evening) – set out small mammal traps for mark-recapture

Wednesday (3/27): Coal Oil Point

- Field (morning) – check mammal traps
- Late morning Lecture – Aquatic biodiversity surveys and indices of biotic integrity
- Field (~1pm – 4pm) – Aquatic macroinvertebrate sampling in Refugio Creek
- Field (evening) – set mammal traps for night two

Thursday (3/28): Coal Oil Point

- Field (morning) – check traps
- Field (day) – Snowy Plover program overview from Cris Sandoval (COPR) – 9-10:45am
- Assignment 3 (afternoon work time and discussion) – mark-recapture estimation of animal population size

Friday (3/29): Sedgwick

- Morning Lecture – Remote sensing and emerging technologies and data for biodiversity monitoring
- Field (late morning to afternoon) – GEE Exercise; collect camera traps (or leave for longer collection)
- Happy hour