Biology 406: Plant Ecology I

Instructor: Dr. Gary Bradfield
Credits: 4.0
Format: 3 hours of lecture per week/3 field lab projects per term
Prerequisites: Biol 304 and/or Biol 306
Offered: Term 1; Alternate years

Course description: This is a practical course dealing with sampling, quantitative analysis, and interpretation of plant communities and their underlying causal factors. At the end of this course students will be equipped with basic skills to pursue post-graduate field research in plant ecology or to satisfy entry-level knowledge requirements for design of field sampling programs and data analysis methods on biological survey teams in government or private industry.

Course topics:

1. Thinking like a plant ecologist – 4 lectures introducing examples of vegetation patterns and processes, including a class walk to visit and discuss the vegetation ecology of a UBC green space.
   Learning outcomes:
   - recognize the complexity of ecological interactions at different spatial and temporal scales in plant communities
   - design a small-scale study to describe and explain the distribution pattern of a UBC lawn weed (Lab Project 1)

2. Vegetation sampling – 9 lectures covering the mechanics of designing and implementing field sampling programs for vegetation surveys and targeted research objectives.
   Learning outcomes:
   - gain appreciation for the importance of proper sampling design in ecological field studies
   - compare the results and interpretations arising from different sampling designs applied to the same forest stand map (Lab Project 2)

3. Entering the matrix – 5 lectures on the transition between the completion of field sampling and the start of data analysis.
   Learning outcomes:
   - organizing ecological field data into Excel spreadsheets for analysis of patterns and correlations using current, research-level software
   - gain appreciation for abstract concepts such as data clouds, vectors, and gradients for deeper understanding of vegetation-environment relationships

4. Classification methods – 5 lectures covering some of the major classification methods currently used by vegetation ecologists.
   Learning outcomes:
   - apply, interpret, and compare results from some of the major classification methodologies used by vegetation scientists around the world

5. Ordination methods – 5 lectures covering some of the major ordination methods currently used by vegetation ecologists.
   Learning outcomes:
   - apply, interpret, and compare results from some of the major ordination methodologies used by vegetation scientists around the world

6. Discussion papers – 2-3 lectures of student-led discussions of journal articles on ecological topics of interest to the class.
   Learning outcomes:
   - gain experience in critical reading and developing a questioning approach when reading published articles in ecology

- gain appreciation for clear communication in text, tables, figures and graphs when reporting results from an ecological study

7. Student presentations of field projects (Lab Project 3)
    Learning outcomes:
    - develop practical skills for independent and collaborative work on the design, implementation, and communication (oral and written) of a plant community field study

Research Labs: The labs are an integral part of this course, comprising 60% of the total mark. The labs are based on the concept of problem based learning and are designed around field research projects carried out individually or in teams of 3-5 students. The major lab project (Project 3) requires student teams to design and carry out a study of vegetation ecology in Pacific Spirit Park. Normally, students spend the equivalent of 2-3 days (on weekends) doing field work during October and November.

Assessment: Project 1 (Pattern in UBC lawn weeds. Team based.) – 10%
    Project 2 (Forest map sampling and quantitative description. Individual based.) – 10%
    Project 3 (Vegetation ecology in Pacific Spirit Park. Team based.) – 40%
    Final exam (2 hr, based mainly on lecture material) – 40%

Course readings: A readings package is available for purchase in the UBC Bookstore.