Plant Ecology (Biol. 3114 FA, 2019)
Course outline

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Introduction

Complex interactions of many biotic and abiotic factors exist in natural plant communities. The lecture component of this course was designed to offer a theoretical understanding of these interactions. In this course broad descriptive, as well as specific quantitative approaches will be used to identify and understand the structural and functional attributes and functional mechanisms of plant communities. Dominant biotic interactions (plant-to-plant, plant-microbe, interactions such as competition, symbiosis and allelopathy) and the role of environmental factors such as fire, microclimate and soil will be studied.

A general introduction will be given before each laboratory exercise followed by an outline of objectives and methods. While some of the exercises are original, a large part of this manual contains borrowed and modified versions of published texts, unpublished manuals and handouts. I would like to thank Robin Bloom and Eric Lamb for their help with an earlier revision of this manual. Lab manuals always need changes and refinements as new knowledge comes to light. I welcome feedbacks from students and colleagues for its further improvement.

The course will begin with a general introduction to plant ecology followed by more advanced treatments of selected topics on the subject. Theoretical concepts of ecosystem, plant community structure and function with particular emphasis on plant community response to disturbance. These aspects will be covered in class lectures and discussions, field and laboratory exercises, and student presentations. Lecture topics include the following:

1. Introduction of plant ecology
2. Plant geography and vegetation description
3. Association and plant community concepts
4. Descriptive classification of vegetation
5. Ecosystem concept
6. Quantitative classification of vegetation
    i) vegetation sampling techniques
    ii) direct and indirect gradient analysis,
    iii) cluster analysis
    iv) association analysis
    v) ordination

5. Vegetation dynamics: Succession

i) successional pathways/mechanisms
ii) progressive succession
iii) retrogressive succession
iv) cyclical process

6. Functional classification of plant communities
   i) vital attributes of species
   ii) species traits (CSR model)
   iii) R* hypothesis
7. Species interactions
   i) competition
   ii) allelopathy
8. Competition and allelopathy in natural and managed ecosystems
   i) fire suppression and vegetation change
   ii) restoration ecology
9. Forest ecology and management
10. Soils
   i) classification
   ii) soil physics
   iii) soil chemistry
   iii) soil biology
   iv) soil erosion and soil conservation
11. Ecological modeling
   i) concept
   ii) classification
   iii) model building
   v) model use for prediction and forest management
12. Review

Distribution of Marks

A.	Theory (from lectures and labs)	
	1. Mid-term exam	10
	2. One class presentation and participation in discussions	10
	3. A three -hour final exam (early December)	35
		55%
B.	Practical (laboratory and field work)	
	1. November - Examination	15
	2. Comprehensive Laboratory and Fieldwork Reports	30
		45%
	TOTAL	**100%**

Schedule for Plant Ecology Labs (Fall 2019)

Week	Date	Topic	Lab report due date
1	9/10/19	Intro to Lab and Lab Instructor	
2	9/17/19	Field trip to Mt. McKay	
3	9/21/19	Hawkeye Lake field trip (**all day Saturday)**	
4	9/24/19	Succession lab	Mount McKay lab (3%)
5	10/01/19	Ordination Lecture	Quadrat size lab (3%)
6	10/08/19	Ordination Lecture and PC-ORD	Succession lab (7%)
7	10/15/19	Allelopathy intro. and experiment set up	
8	10/22/19	Allelopathy measurement & data analysis	Ordination lab (10%)
9	11/29/19	Presentations	
10	11/05/19	Presentations	
11	11/12/19	Presentations	Allelopathy lab (7%)
12	11/19/19	Lab Exam	

Please be sure to regularly check your Lakehead University e-mail account for updates and changes to the laboratory schedule

Course objectives and outcomes– *What will you learn?*

***Objectives**: From this course you will …*

- develop knowledge in theories and concepts in Plant Ecology by attending the lectures. By conducting fieldwork and lab work you will develop skills to identify different vegetation types in natural landscapes, learn vegetation survey methods, data recording and analyses using statistical tools.
- develop skills to organize, write and present scientific information by giving class presentation and writing lab reports.
- become comfortable in discussing issues related to plant ecology and environment.
- appreciate the breadth and depth of the fields and be comfortable in discussion issues related to ecosystem disturbance and vegetation management.
- improve and expand your critical understanding on major theories and concepts in ecology sciences.

Outcomes*: By successfully completing this course you will be able to…*

- appreciate the complexity of disturbance mediated plant-habitat and plant-plant interactions by understanding theories and concepts in Plant Ecology.
- conduct vegetation survey, data analysis and writing technical/scientific reports.
- discuss issues related to plant ecology and environment.
- Deliver and evaluate oral presentations and ask and answer questions.