COURSE INSTRUCTOR
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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of the exercises are original, a large part of this manual contains borrowed and modified versions of published texts, unpublished manuals and handouts.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.

Course Outline

Plant Ecology (Biol 3114 F)

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. Class review for final exam.

Schedule for Plant Ecology Labs (Fall 2020, all labs are virtual)

Week	Date	Topic	Lab report due date
1	9/15/20	Intro to Lab and Lab Instructor, Plant ID	
2	9/22/20	Field trip to Mt. McKay	
3	9/29/20	Hawkeye Lake field trip	
4	10/06/20	Succession lab	Mount McKay lab (3%)
5	10/13/20	Fall Study Week	
6	10/20/20	Ordination Lecture	Quadrat size lab (3%)
7	10/27/20	Ordination Lecture/PC-ORD	Succession lab (7%)
8	11/03/20	Experimental Design	Ordination lab (8%)
9	11/10/20	Allelopathy Lab	Ordination lab (2^{nd} sub)
10	11/17/20	Student presentations	Experimental design (3 %)
11	11/24/20	Student presentations	Allelopathy lab (6%)
12	12/01/20	Lab Exam	

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

Mid-term (in class) exam……Wednesday, October 7, 2020

Text books

Required:

1. Ecology (5th Edition) by W.D. Bowman & S.D. Hacker

2. Forest Ecology (3rd Ed) By J.P. Kimmins (UBC press).

Other Recommended Texts:

Terrestrial Plant Ecology (3rd Ed). Barbour, M.G, Burk, J.H., Pitts, W.D., Gilliam, F.S. and Schwartz, M.W. 1999., Benjamin/Cummings, Don Mills, Ontario. p.649. Out of print

Plant Ecology: Ernst-Detlef Schulze *et al.* (Eds.) 2019.Springer (free download from internet)

Ecology of Plants (2nd Ed): J. Guervitch, S. Schneir & G.A. Fox (Sinauer Associates, Inc. Massachusetts, USA)

Laboratory Manual: Plant Ecology (Biology 3114) A.U. Mallik

Distribution of Marks

Theory component:	**Marks**
Active learning (class discussion)	10
A mid-term examination (Oct 7)	10
One class presentation	10
A three-hour final examination	25
	55%
Practical (labs & Lab reports)	
Lab quizzes	5
November lab. examination	15
Comprehensive lab reports	25
	45%