

UNIVERSITY OF BRITISH COLUMBIA

BIOLOGY 407 & BOTANY 527 PLANT ECOLOGY 2

INSTRUCTOR: Roy Turkington Biodiversity Research Center 105
phone 2-2141
royt@interchange.ubc.ca
<http://www.botany.ubc.ca/turkington/>

TEACHING ASSISTANT: Bill Harrower Biodiversity Research Center 203
harrower@interchange.ubc.ca

TIMETABLE: Lectures: Tue, Thur 2:00 – 3:30 SWNG (West Mall Swing Space) 405
Tutorials: Mon 10:00 – 11:00 FNH (Food, Nutrition, Health) 30

COURSE DESCRIPTION:

Biology 407 assumes that you have a basic understanding of ecological principles and concepts taught in 3rd year core courses. The course focuses on population aspects of plant ecology and particularly the biotic processes that generate the observed patterns in plant populations, and how these relate to patterns at the community level. The course is organized as 7 blocks, mostly 2 weeks each. Each block focuses on a specific subject area and will typically have a lecture block and either a discussion or tutorial period with an accompanying paper you are required to read.

My teaching focus is student-centered and as such, I do not expect to make an ecologist of every student. Rather my goal is to provide students with transferable skills such as critical and independent thinking, logical inference, inquisitiveness and effective communication.

COURSE OUTLINE:

Week of	Lecture Topic	Reading for lectures
September 7 ¹	Grime's model	Grime 1977
14	Grime's model	
21	Tilman's model	Tilman 1990
28	Tilman's model	
October 5 ²	Hubbell's model	Hubbell 2001 + summaries
12	Population dynamics	Silvertown 1987; Brown 2001;
19	Population dynamics	Telewski, F.W. & J.A.D. Zeevaart. 2002
26	Competition	Gurevitch et al. 2006 (cpt. 10)
November 2	Competition	"lots" ☺
9	Herbivory	Gurevitch et al. 2006 (cpt. 11)
16	Herbivory	
23	Biodiversity & coexistence	Keddy 1990
30	Biodiversity & coexistence	

¹ September 7th is Labor Day, the 8th is IMAGINE UBC, so our first class will meet on Thursday Sept. 10th.

² No tutorial on Monday 12th October, Thanksgiving Day.

COURSE READINGS:

A package of **required** "readings" is available from the bookstore; these include papers that you are required to read for tutorial sessions. Also included in the package are a few other papers that you will find useful for your essay assignment, and other assorted handouts.

TUTORIALS:

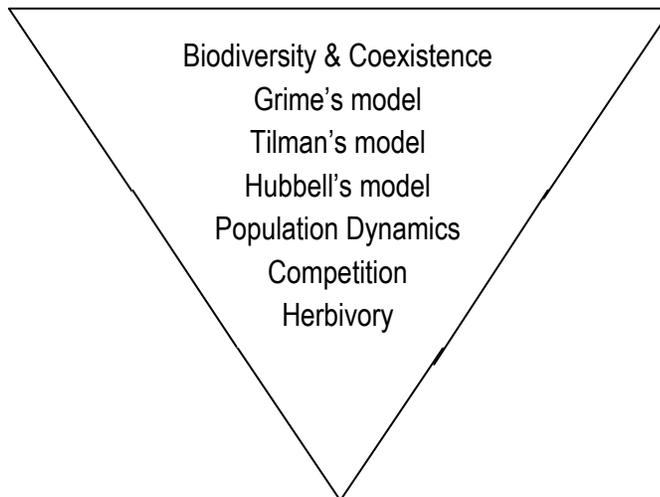
Tutorials will meet according to the schedule below. Tutorials will be lead by the TA, Bill Harrower, (unless indicated otherwise below). They will be used to discuss some controversial papers, topics and methodology.

	Tutorial	Task
Sept 14	Read Kuyper 1991	Read the paper; no hand-in; class discussion (Roy)
21	Evaluate Grime	** Search the literature for 3 reviews of Grime's books; write a 300-word summary, in addition to your 3 citations; class discussion
28	Evaluate Tilman	** Search the literature for 3 reviews of Tilman's book; write a 300-word summary, in addition to your 3 citations; class discussion
Oct. 5	Essay "preparation"	We will describe procedures and expectations for your essay (Roy)
12 No tutorial	
19	Evaluate Porsild et al. 1967	** You will be required to submit a 300 word summary/evaluation of each paper on the Friday prior to the discussion session. Graduate students registered for the course, along with the TA, will each lead 2 or more tutorial discussions. Everyone should come to class prepared to contribute to the discussion. A mark will be assigned for the written submission and participation in the discussions.
26	Naeem, Tilman (& Huston)	
Nov 2	Diversity and productivity	
9	Evaluation of deWit	
16	The Oksanen problem	
23	Evaluate Callaway	

COURSE STRUCTURE AND LEARNING OUTCOMES:

The entire course can be viewed as an inverted triangle:

- Population dynamics is influenced by competition and herbivory.
- Population dynamics is the basis for Grime, Tilman and Hubbell's (GTH) models
- GTH models are a framework for understanding the plant ecological world



Rank importance	Lecture Topic	Reasons
1	Biodiversity & coexistence	<i>The reasons why species coexist is one of the most profound and enduring questions in plant (and animal) ecology. Coexistence is the basis of biodiversity. Grime's and Tilman's models provide plant ecologists an important framework to understand the processes that allow coexistence, and to the predict biodiversity consequences of habitat change.</i>
1	Grime's model	
1	Tilman's model	
2	Hubbell's model	<i>Hubbell's' model challenges many of the foundational principles of both Grime and Tilman, and pedagogically it provides students with a lot of mind-bending to reconcile the conflicting principles and consequent conflicting predictions.</i>
3	Population dynamics	<i>Grime, Tilman and Hubbell are all based on the population dynamics of plants – seed banks, dormancy, dispersal, germination and recruitment. The student has a much better understanding of the models if they are familiar with the underlying ecology.</i>
4	Competition	<i>Competition and herbivory both have a major impact on population dynamics and both are integral to understanding Grime, Tilman and Hubbell.</i>
4	Herbivory	

LEARNING OUTCOMES – by the end of the course the student should:

1. Demonstrate a detailed knowledge and understanding of the major components of a plant's life cycle – seed banks, dispersal, dormancy, germination and recruitment.
2. Have a thorough understanding of the roles of competition and herbivory in the structuring of plant populations and plant communities.
3. Have a thorough knowledge of experimental design especially as it pertains to studying plant competition.
4. Be able to develop from first principles, two of the major global models in plant ecology – Grime, Tilman - and have a basic understanding of Hubbell.
5. Be able to apply concepts and theories acquired throughout the course to the understanding of biodiversity and coexistence.
6. Be familiar with the major “citation classics” in plant population ecology.
7. Be able to able to critically read, and evaluate, scientific papers.

ASSESSMENT of learning outcomes is achieved by::

All assignments must be submitted on or before the due date, unless prior approval has been granted for an extension.

Marks for the course will be awarded as follows:

- I would like to meet each student individually in my office before Friday 18th Sept. to discuss your "intake questionnaire"; please give me your questionnaire at least 2 days before coming to my office. Please make an appointment ASAP because I don't want everyone piling up on the last day. This is worth 2.5%
- Tutorials 20%. Eight of the tutorials will form the marking scheme (marked with an ** above). You WILL NOT receive any marks for the first 3 tutorial assignments that you hand in! The remaining 5 "hand-ins" are worth 2%, 3%, 4%, 5% and 6% respectively; all marks will be divided equally between written submission and participation in the class.
- A few in-lecture pop quizzes worth 7.5%
- Major Essay 30%
Title "***Does the intensity of competition change along a productivity gradient?***" (4000 words **strict limit**; due November 6th). The essay submitted by those students registered in BOTA 527 will have a **limit of 5000 words**. Everything you need to start this essay is in the course package.
- Final exam worth 40%. The final exam will consist of three essay-like questions; (all worth equal marks) a compulsory question and 2 others (from a choice of 10 or 12; samples from previous years will be provided). The compulsory question:

*"Assess the significance of J.L.Haper's "Darwinian Approach" to the study of plant ecology"*³

³ You have the option of writing and submitting this answer before the final exam (1000 words max).