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# BIOL 416

## Terrestrial Ecosystems

Fall Term (2016-17)

### CALENDAR DESCRIPTION

Principles of terrestrial ecosystem ecology: soils; plant-soil interactions; energy and water balance; carbon and nutrient cycling; species effects; landscape-level and whole earth biogeochemistry; global change.

NOTE Overnight field trip: estimated cost \$50.

PREREQUISITE BIOL 303/3.0 or GPHY 317/3.0. ONE-WAY EXCLUSION May not be taken with or after BIOL 510/3.0.

### SCHEDULE

**Lectures: Wednesdays 10.00-11.30; Fridays 8.30-10.00. BIOSC 3110.**

**LabTuesdays: 8.30-11.30. BIOSC 3311.**

<b>Instructor</b>	<b>Dr. P. Grogan</b>
<b>Instructor Contact</b>	<a href="mailto:groganp@queensu.ca">groganp@queensu.ca</a> Phone: 613-533-6152
<b>Office Hours</b>	To be determined
<b>TA:</b>	Harris Ivens
<b>TA Contact Information</b>	Room 2507, Biosciences complex. 533 6000 ext.78059
<b>Office Hours</b>	To be determined

### Learning Objectives

By the end of this course, the student should be able to:

1. Explain and evaluate the major concepts underlying terrestrial ecosystem ecology
2. Describe and contrast the major processes and features that distinguish local terrestrial ecosystem-types, including farm-types
3. Present a synthetic, logical and individualistic seminar on a fundamental issue in agroecosystem ecology
4. Develop, conduct, analyse, and write a lab/field research study that addresses a student-inspired question in agroecosystem ecology

### Learning Hours

<i>Teaching method</i>		<i>Average hours per week</i>	<i>Number of weeks</i>	<i>Total hours</i>
In-class hours	Lecture	1	12	12
	Seminar	2	12	24
	Laboratory	3	6	18
	Tutorial			
	Practicum	1	12	12
	Group learning	1	12	12
	Individual instruction			

Other	Online activity	1	12	12
	Off-campus activity	16	1	16
	Private study	1.5	12	18
Total hours on task				124

### **Course Outline**

The ecosystem approach to ecology treats organisms and the physical aspects of their environment as components of a single integrated system. Terrestrial ecosystem functioning is governed by interactions amongst animals, plants, and soil organisms, as well as exchanges of energy and resources with the atmosphere, soils, rocks, and aquatic environments. This advanced undergraduate level ecology course is focused on plant-soil interactions as being a fundamental determinant of the structure and functioning of terrestrial ecosystems around the world. As a group, we will attempt to synthesize recent advances arising from the ecosystem approach with established ecological theory to describe and explain ecosystem-level patterns and processes in the terrestrial environment.

The course content for 2016/17 in particular will be centered around developing and applying terrestrial ecosystem ecological concepts to address the following thematic question: *What feasible changes in agroecosystem management would be most effective to meet global food demands in 2050?*

Initial seminars by the course professor will introduce The ecosystem concept; The climate system; Soil development; Soil transformations; Soil physical and chemical properties; The biology of soils; Decomposition; Plant-soil interactions; Ecosystem trophic dynamics; Ecosystem herbivory; Sustaining socio-ecological systems.

Subsequent seminars will be led by individual students on particular topics of their choosing.

### **Textbooks/Readings**

Principles of Terrestrial Ecosystem Ecology. 2011. 2nd edition. Chapin, F.S. III, Matson, P.A. and Mooney, H.A. Springer.

Selected seminar papers chosen by prof and by the students to be posted on the onQ system and referenced on the course web site (<http://post.queensu.ca/~biol416/index.html>).

### **Grading Scheme**

<b>Component</b>	<b>Weight (%)</b>	<b>Date</b>
Participation in discussion	10	Ongoing through course
Seminar questions	10	Ongoing through course
Seminar	25	To be determined
Field trip presentation	5	To be determined
Research report	25	To be determined
Final synthesis writing exercise	25	To be determined

### **Grading Method**

In this course, some components will be graded using numerical percentage marks. Other components will receive letter grades, which for purposes of calculating your course average will be

translated into numerical equivalents using the Faculty of Arts and Science Letter Grade Input Scheme.

When letter grades are employed, the following scale will be employed for purposes of calculating your course average:

***Arts & Science Letter Grade Input Scheme***

Assignment mark	Numerical value for calculation of final mark
A+	93
A	87
A-	82
B+	78
B	75
B-	72
C+	68
C	65
C-	62
D+	58
D	55
D-	52
F48 (F+)	48
F24 (F)	24
F0 (0)	0

Your course average will then be converted to a final letter grade according to Queen's Official Grade Conversion Scale:

***Queen's Official Grade Conversion Scale***

Grade	Numerical Course Average (Range)
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

**Academic Integrity and Queen's Code of Conduct**

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments and conduct conform to the principles of academic integrity. Information is available in the Arts and Science Calendar (see Academic Regulation 1 - <http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations>, on the Arts and Science website (see <http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity>), and at Biology's website (<http://www.queensu.ca/biology/undergrad/integrity.html>) and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulations on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

### **Accommodation Policy, Exam Conflicts, and Other Conflicts**

Students who feel they need accommodations for disabilities or extenuating circumstances, or have a conflict between exams or other commitments should consult the Biology Department's website for details about how to proceed (<http://www.queensu.ca/biology/undergrad/integrity.html>). In general, the earlier a course coordinator is apprised of an extenuating circumstance, the more likely an accommodation can be made. Students are encouraged to be proactive in anticipating difficulties, when it is possible to do so.

Students may apply to write a make-up or deferred exam if they have an exam conflict as defined in the Academic Regulations of the Faculty (See Arts and Science Calendar Regulation 8 - <http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations>). In this case, the student should report to the Exams Office first to verify that there is a genuine exam conflict. Biology professors will not consider your situation to be a conflict unless it meets the criteria set out by the Faculty of Arts and Sciences.

Students may request a make-up or deferred exam if they have an exam conflict with off-campus travel associated with a field course (e.g BIOL-307/3.0 or 407/3.0) that is held during the fall or winter terms.

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### **Accommodation of Disabilities**

*Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact the Disability Services Office (DSO) and register as early as possible. For more information, including important deadlines, please visit the DSO website at: <http://www.queensu.ca/hcds/ds/>*