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# **BIOL 416**

## **Terrestrial Ecosystems**

Winter Term (2022)

### **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 300/3.0 or GPHY 317/3.0. ONE-WAY EXCLUSION May not be taken with or after BIOL 510/3.0.

### **SCHEDULE**

**Lectures:** To be determined

**Lab:** To be determined

<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>	To be determined
<b>TA Contact Information</b>	E-mail: @queensu.ca
<b>Office Hours</b>	To be determined

### **Learning outcomes**

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

1. Explain and evaluate the major concepts underlying terrestrial ecosystem ecology that distinguish it from lower hierarchical levels such as community and population ecology
2. Describe and contrast the major processes and features that distinguish local terrestrial ecosystems, especially in the context of how soil-plant relationships influence farmers' crop-type choices
3. Formulate clear, original, challenging, and concise thematic questions from study reading material that are likely to lead to focussed and intellectually probing seminar group discussions, student-led seminar topics or short essay writing pieces
4. Explain the concept of food insecurity as it applies at both local (Kingston) and global scales

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5. Synthesize, evaluate, and critique the potential solutions to meeting future local and global food demands
6. Present a stimulating, informative and creative seminar on a fundamental issue connecting agroecosystem ecology and global food supply/demand
7. Develop an original, cohesive, synthesis essay on the distinctive concepts of ecosystem-level ecology that would be most useful in developing and expanding sustainable farming practices.

### 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			
	Seminar	3	12	36
	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 the Fall 2019 iteration will be centered on identifying, critiquing, and applying terrestrial ecosystem ecological concepts to address the following thematic question: ***What specific terrestrial ecosystem-level ecology concepts would be most beneficial to***

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***meeting global food demands in 2050, while also addressing industrial agriculture's deleterious impacts on soil, air, and human well-being?***

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; 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 (<https://www.queensu.ca/terrestrial-ecosystem-ecology/teaching/biol-416-terrestrial-ecosystems> ).

### **Grading Scheme**

<b>Component</b>	<b>Weight (%)</b>	<b>Date</b>
Participation in discussion	15	Ongoing through course
Seminar questions	15	Ongoing through course
Seminar	25	To be determined
Participation in research experiment	15	To be determined
Final synthesis essay	30	To be determined

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### **Grading Method**

All components of this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade according to Queen's Official Grade Conversion Scale:

*Queen's Official Grade Conversion Scale*

<b>Grade</b>	<b>Numerical Course Average (Range)</b>
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

### **Location and Timing of Final Examinations**

The exam dates for each Term are listed on the Faculty of Arts and Science webpage under "Important Dates." Student exam schedules for the Fall Term are posted via SOLUS immediately prior to the Thanksgiving holiday; for the Winter Term they are posted on the Friday before Reading Week, and for the Summer Term they are individually noted on the Arts and Science Online syllabi. **Students should delay finalizing any travel plans until after the examination schedule has been posted. Exams will not be moved or deferred to accommodate employment, travel/holiday plans or flight reservations.** Also, as indicated in Academic Regulation 8.3, students must write all final examination in all on-campus courses on the Kingston campus.

### **Statement on Academic Integrity**

Academic Integrity is constituted by the six core fundamental values of honesty, trust, fairness, respect, responsibility and courage (see [www.academicintegrity.org](http://www.academicintegrity.org)). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities <http://www.queensu.ca/secretariat/policies/senate/report-principles-and-priorities>).

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Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 <http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations/regulation-1>), on the Arts and Science website (see <http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity>), 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 regulation 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.

### **Accommodations for Disabilities**

Queen's University is committed to achieving full accessibility for people 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. The Senate Policy for Accommodations for Students with Disabilities was approved at Senate in November 2016 (see <https://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslclwww/files/files/policies/senateandtrustees/ACADACCOMMPOLICY2016.pdf>). If you are a student with a disability and think you may need academic accommodations, you are strongly encouraged to contact the **Queen's Student Accessibility Services (QSAS)** and register as early as possible. For more information, including important deadlines, please visit the QSAS website at: <http://www.queensu.ca/studentwellness/accessibility-services/>

### **Academic Consideration for Students with Extenuating Circumstances**

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances that are beyond their control and are interfering with their ability to complete academic requirements related to a course for a short period of time, not to exceed three months. Students receiving academic consideration must meet all essential requirements of a course. The Senate Policy on Academic Consideration for Students in Extenuating Circumstances was approved at Senate in April, 2017 (see <http://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslclwww/files/files/policies/senateandtrustees/Academic%20Considerations%20for%20Extenuating%20Circumstances%20Policy%20Final.pdf>) Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. Arts and Science undergraduate students can find the Faculty of Arts and Science protocol and the portal where a request can be submitted at: <http://www.queensu.ca/artsci/accommodations>. Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

If you need to request academic consideration for this course, you will be required to provide the name and email address of the instructor/coordinator. Please use the following:

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Instructor/Coordinator Name: Dr. Paul Grogan

Instructor/Coordinator email address: [groganp@queensu.ca](mailto:groganp@queensu.ca)

### **Turnitin Statement**

Queen's University has partnered with the third-party application Turnitin to help maintain our standards of excellence in academic integrity. Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. Submitted files are compared against an extensive database of content, and Turnitin produces a similarity report and a similarity score for each assignment. A similarity score is the percentage of a document that is similar to content held within the database. Turnitin does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process.

### **Copyright**

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