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**BIOL 303**  
**Community and Ecosystem Ecology**  
Winter Term 2017

**CALENDAR DESCRIPTION**

**An introduction to the major ecological concepts at the community and ecosystem scales. Patterns and mechanisms underlying: community structure; biogeographic patterns; element cycles in terrestrial and aquatic ecosystems. Environmental problems are assessed in terms of ecological principles. Laboratory work includes field studies as well as individual and group projects.**

Biology 303 students who are most interested in ecology should plan to also take Biology 302\* (Population and Evolutionary Ecology) offered in the fall term. Biology 302 introduces the major ecological concepts that apply at the organism and population scales, and therefore complements Biology 303. Topics include the factors that affect the growth and dynamics of populations within natural habitats, including competition for resources, predation, parasitism and mutualism. Emphasis will be placed on a fundamental interpretation of these patterns in terms of mechanisms and consequences of evolution by natural selection.

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<b>Learning Facilitators (T.A.s):</b>	Amanda Cicchino Harris Ivens Caleb Yee
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## Learning Objectives

Community and ecosystem ecology addresses many of the mechanisms underlying biological patterns of abundance, diversity, and spatial and temporal distributions of biota and habitats. This course introduces students to the major concepts, themes and current issues within ecology at the community and ecosystem levels. Course content will be interesting and informative – our primary intention is to stimulate your own thinking on ecological ideas. Concepts will be illustrated with exciting, cutting edge examples from published research, case studies and student lab and field practicals. By the end of this course, students should be able to:

1. Explain the basic concepts underlying community and ecosystem ecology, and provide a critique of their strengths, shortcomings and significance
2. Use community and ecosystem ecological perspectives to understand and assess current environmental issues in both terrestrial and aquatic contexts
3. Identify and assess the linkages between evolution and ecology at the community and ecosystem levels
4. Apply community and ecosystem ecological concepts to generate hypotheses and understand patterns in student-collected ecological data
5. Review, evaluate, synthesize and present research on a self-selected core topic in community or ecosystem 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	1.58	12	19
	Seminar	1	1	1
	Laboratory	3	8	24
	Tutorial			
	Practicum			
	Group learning	1	4	4
	Individual instruction			
Other	Online activity	1	12	12
	Off-campus activity	3	2	6
	Private study	5	12	60
<b>Total hours on task</b>				<b>126</b>

## **Course Material**

The required textbook for BIOL 303 is Ecology: Concepts and Applications, by Manuel C. Molles Jr. and James F. Cahill Jr., 3<sup>rd</sup> Canadian Edition. Note that although we will be working directly from this Canadian edition, additional readings from other sources will also be assigned from time to time.

## **Website**

This course is being run on the new Queens learning system called 'onQ'.

Please log in to [onq.queensu.ca](http://onq.queensu.ca) with your NetID to access the course material. Unlike Moodle where it is automatic, in the new onQ system you will receive an initial e-mail asking if you wish to 'opt in' to automatically receive future messages from the teaching team. Please make sure to accept. If you do not, you will miss critically important e-mails, and the teaching team will not be responsible for the consequences.

## **Assessment**

### Lectures

Continuous assessment quizzes (4 x 4 marks each)	16%
Midterm (during regular lecture time, February 13th)	12%
Final exam (scheduled by exams office)	22%

### Labs

Literature Review	10%
Seminar	10%
Biodiversity Experiment	10%
Succession Study	10%
Footprint data entry and discussion	5%
Lab notebook, field ID	5%

## **Course Policies:**

### Attendance

You are required to attend all lectures and labs. This is critical for your success in the course. Paul has collected attendance data from this course over several years that clearly demonstrates the grade benefits of being present at, and engaged in, all lectures. He will be happy to share these data with you on request. Lecture slides are designed to support what is being discussed in lecture, but do not have enough written material on them to be useful for teaching on their own, and therefore are insufficient to gain a pass grade in the examinations. Thus, it is essential that you attend lecture and take good notes. If you miss a lecture or lab, it is up to you to catch up from your fellow students and/or ask permission to attend a make-up lab.

## Exams

The midterm will be held in-class and the final exam is scheduled by the exam office. Exams are mandatory, and alternative arrangements can only be made for medical or extenuating circumstances following the guidelines on the Biology department website: <http://biology.queensu.ca/default/assets/File/ExtenuatingCircumstancesForm.pdf>

## Laboratory Work

All reports should be submitted to your TA in labs unless stated otherwise.

The penalty for late reports is 5% per day unless you have a special dispensation (see the "Dispensations" section in the course manual). Extensions will not be given due to work load in this or other courses, so budget your time carefully. Always keep a copy of each report / assignment that you hand in; if the file is lost or corrupted in transfer before it has been marked, it is your responsibility to produce another copy if requested. All reports and assignments must be written individually by each student. You may work on data analyses in groups but if you do, you must report the names of your study group members as a footnote on the title page of your assignment or report. MAKE SURE that the text of your report is written individually by you, in your own words. Any assignment that is handed in independently is expected to reflect your own independent efforts.

## **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.

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The BIOL303 teaching team are committed to fully pursuing investigations of breaches of academic integrity because they are unfair to other students. Regrettably, we have reported to the Dean several findings of academic integrity breaches in both the lab and lecture sections of this course in the past, so please be very careful to ensure you are clear on your

responsibilities.

### **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.

#### **Extenuating Circumstances:**

The issue of extenuating circumstances and extensions is a difficult one for both instructors and students. On the one hand, unforeseen events and critical personal circumstances arise from time to time. On the other hand, a small number of students abuse the instructor's goodwill in various ways including frequently requesting extensions for trivial reasons. The teaching team in this course is committed to being understanding and sensitive, but also responsible and firm in assessing requests for accommodations. Each request will be considered in the context of fairness to all the other students on the course. See the Biology Department's website for information about our policy and the form that you will need for missed labs and/or for large assignments or presentations:

<http://biology.queensu.ca/academics/undergraduate/prepare-yourself/>

### **Copyright**

The material on this website is copyrighted and is for the sole use of students registered in Biol 303. The material on this website may be downloaded for a registered student's personal use, but shall not be distributed or disseminated to anyone other than students registered in Biol 303. Failure to abide by these conditions is a breach of copyright, and may also constitute a breach of academic integrity under the University Senate's Academic Integrity Policy Statement.

## **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/>*

## **Preliminary Lecture Schedule**

Lectures will be a mix of interactive material presentation, case studies, and class discussion. Note that the schedule below is preliminary, and changes are likely as the course develops. Accordingly, you are expected to be available for all the timetabled sessions, and should plan accordingly. Note that some of the Wednesday sessions toward the end of term will be in the specialized active learning classroom (Room 321 to be confirmed) in the Ellis Hall building.

Date	Topic
January 9th (Monday 09.30)	No lecture
Fundamentals	
January 11 <sup>th</sup> (Wednesday 08.30)	Course introduction—current concepts & big issues
January 12 <sup>th</sup> (Thursday 10.30)	Discussion: An Inconvenient Truth (Documentary film)
January 16th (Monday 09.30)	Community & ecosystem ecology— conceptual frameworks
January 18 <sup>th</sup> (Wednesday 08.30)	Species abundances and diversity
January 19 <sup>th</sup> (Thursday 10.30)	Case study. Understanding the effects of anthropogenic activity and climate change on freshwater food webs using palaeolimnology (Guest lecture - Cecilia Barouillet - senior M.Sc. student)

Date	Topic
Interactions	
January 23rd (Monday 09.30)	Controls on community structure I: Niches, habitat heterogeneity and Competition
January 25 <sup>th</sup> (Wednesday 08.30)	Controls on community structure II: Competition and Disturbance
January 26 <sup>th</sup> (Thursday 10.30)	No lecture
January 30th (Monday 09.30)	Winter ecology tutorial
February 1st (Wednesday 08.30)	Controls on community structure III: Predation and Omnivory
February 2nd (Thursday 10.30)	Controls on community structure IV: The role of regional versus local processes - migration, dispersal, equilibrium theory (Guest lecture - Amanda Tracey – senior Ph.D. student)
Communities and Ecosystems	
February 6th (Monday 09.30)	Biodiversity and ecosystem functioning
February 8th (Wednesday 08.30)	Stability, Dynamics and Alternate stable states
February 9th (Thursday 10.30)	Available class time for review
February 13th (Monday 09.30)	Midterm (in class)
February 15th (Wednesday 08.30)	No lecture
February 16th (Thursday 10.30)	How have humans affected local fish communities? (Guest lecture – Adam Rupnik - senior M.Sc. student)

Date	Topic
February 20th (Monday 09.30)	Reading week
February 22nd (Wednesday 08.30)	Reading week
February 23rd (Thursday 10.30)	Reading week
February 27th (Monday 09.30)	No lecture
March 1st (Wednesday 08.30)	Production in terrestrial ecosystems (abiotic & biotic)
March 2nd (Thursday 10.30)	Net Primary Production and Decomposition in terrestrial ecosystems
March 6th (Monday 09.30)	Succession in terrestrial communities (complements this week of field trips to Lemoine point to observe and measure vegetation succession)
March 8th (Wednesday 08.30)	No lecture
Synthesis topics	
March 9th (Thursday 10.30)	Global carbon cycle
March 13th (Monday 09.30)	Synthesis topic: The phosphorus problem
March 15th (Wednesday 08.30)	Synthesis topic: The phosphorus problem (discussion). ELLIS HALL ROOM 321
March 16th (Thursday 10.30)	No lecture



Date	Topic
March 20th (Monday 09.30)	Nitrogen cycle
March 22nd (Wednesday 08.30)	Climate change in the Arctic: The stoichiometry issue (discussion). ELLIS HALL ROOM 321
March 23rd (Thursday 10.30)	Paul's research lecture. Understanding patterns of plant (and soil microbial) community structure in the low Arctic
March 27 <sup>th</sup> (Monday 09.30)	Synthesis topic: Global change ecology
March 29th (Wednesday 08.30)	Synthesis topic: What can Biology tell us about our Future? (discussion). ELLIS HALL ROOM 321
March 30th (Thursday 10.30)	No lecture
April 3rd (Monday 09.30)	No lecture
April 5th (Wednesday 08.30)	Synthesis, and Review session ELLIS HALL ROOM 321
April 6th (Thursday 10.30)	No lecture

**Preliminary Lab Session Outline**

The purpose of the BIOL 303 labs is to apply what you have learned in the lectures. We minimize time spent on instruction during labs and trips so that you can spend time doing the activities. For this approach to work, you have to come to the labs prepared (i.e., having carefully read the lab protocols in advance).

### Preliminary Lab Session Outline

There is one lab session per week: Monday to Wednesday, 2:30-5:30 in BioSci #2305 or #3311.

\*the cost of field trips in this course is 20\$ per student *due the week of Feb 6<sup>th</sup>*

The first week's lab is online. Come to lab room #2305 on your lab day for the second week of classes (the lab will take ~2.5 hrs)

Week starting	Lab	Graded Student Submissions
Jan 9 <sup>th</sup> Lab 1	FOOTPRINT data analysis	Footprint data entry (0.5%) <i>due by 230 Weds</i>
Jan 16 <sup>th</sup>	FOOTPRINT discussion BIODIVERSITY planting	Footprint discussion (0.5%) Footprint data analysis (4%) <i>due in lab</i>
Jan 23 <sup>rd</sup>	Tree ID for winter ecology field trip	Notebook tree ID (1%)
Jan 30 <sup>th</sup>	Winter ecology field trip to Little Cataraqui Creek	Field ID (1%); notebook field notes (1%)
Feb 6 <sup>th</sup>	Shrub and forb ID for SUCCESSION trip	Notebook shrub and forb ID (1%) Literature review (10%) <i>due by 230 Weds</i>
Feb 13 <sup>th</sup>	BIODIVERSITY harvest	
Feb 20 <sup>th</sup>	Winter break	
Feb 27 <sup>th</sup>	BIODIVERSITY weigh SUCCESSION game	
Mar 6 <sup>th</sup>	SUCCESSION field trip to Lemoine Point	Field ID (1%) Literature review regrade <i>due by 230 Weds</i>
Mar 13 <sup>th</sup>	Seminars	Seminar (10%) <i>Notebooks due</i>
Mar 20 <sup>th</sup>	Seminars	Biodiversity report (10%) <i>due by 230 Weds</i>
Mar 27 <sup>th</sup>	Seminars	Succession report (10%) <i>due by 230 Weds</i>

**Lab Evaluation:** Labs are worth 50% of your final mark:

- Footprint discussion, data entry and data analysis (5%)
- Lab notebook, participation, ID and data entry (5%)
- Literature review (10%)
- Seminar (10%)
- Biodiversity report (10%)
- Succession report (10%)

## **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***

<b>Assignment mark</b>	<b>Numerical value for calculation of final mark</b>
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***

<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