

# BIOL 303

## Community and Ecosystem Ecology

Winter Term (2013-14)

### 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.**

NOTE Field trip estimated transportation cost \$10. LEARNING HOURS 120 (36L;36Lb;48P)

PREREQUISITE BIOL 201/3.0, BIOL 202/3.0 and (a minimum grade of C- in BIOL 206/3.0) and (BIOL 243/3.0 or PSYC 202/3.0 or STAT 269/3.0).

### SCHEDULE

**Lectures: Tuesday 8:30-9:30, Wednesday 10:30-11:30, Friday 9:30-10:30. Dupuis Aud.**

**Labs: See SOLUS for a list of various lab times. BIOSCI.**

<b>Instructor</b>	<b>Wm. Nelson</b>
<b>Instructor Contact</b>	<a href="mailto:nelsonw@queensu.ca">nelsonw@queensu.ca</a> , Phone: 533-6130, Rm. 3506 Bioscience
<b>Office Hours</b>	Fridays 3:30pm-4:30pm
<b>TA:</b>	See Course Website
<b>TA Contact Information</b>	See Course Website
<b>Office Hours</b>	TBA

### 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 practical data.
5. Review, evaluate, synthesize and present research on an ecological topic.

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. This course examines the ecology of lower levels of

organization (organism and population), and therefore complements rather than overlaps with 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.

### 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	3	12	36
	Seminar			
	Laboratory	3	12	36
	Tutorial			
	Practicum			
	Group learning			
	Individual instruction			
Other	Online activity			
	Off-campus activity			
	Private study	4	12	48
Total hours on task				120

### Course Outline

#### LECTURE TOPICS

- L1: Course introduction—current concepts & big issues
- L2: Community & ecosystem ecology—framework
- L3: Research tools—from patterns, to experiments, to theory and back
- L4: Species abundances and diversity
- L5: Niches, habitat heterogeneity and disturbance
- L6: Competition (species competition)
- L7: Predation and omnivory
- L8: Migration
- Tutorial 1: Winter ecology
- L9: Synthesis topic: Tar sands
- L10: Synthesis topic: Tar sands (discussion)
- L11: Biodiversity and ecosystem functioning
- Tutorial 2: Biodiversity experiment
- L12: Succession in terrestrial communities
- L13: Production in terrestrial ecosystems (abiotic & biotic)
- L14: Decomposition in terrestrial ecosystems
- L15: Stability and dynamics (alternative states)
- L16: Succession in lakes
- L17: Synthesis topic: The phosphorus problem
- L18: Synthesis topic: The phosphorus problem (discussion)
- L19: Research Lecture

- L20: Stoichiometry
- L21: Global carbon cycle
- L22: Nitrogen cycle
- L23: Research lecture
- L24: Synthesis topic: Global change ecology
- L25: Synthesis topic: Global change ecology (discussion)

### Textbooks/Readings

Molles, Manuel C. Jr. and James F. Cahill Jr., Ecology: concepts and applications. 2<sup>nd</sup> Canadian Edition, 2011, McGraw-Hill

### Grading Scheme

Component	Weight (%)	Date
Laboratory: Independent study of current research (Lit Rev & Seminar)	10	TBA
Laboratory: Biodiversity experiment	15	TBA
Quizzes (during regular lecture time)	10	TBA
Midterm (during regular lecture time)	15	February 12th
Final exam	25	scheduled by exams office

### 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.

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.

### **Copyright**

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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/>*