BIOL 509
Limnological Environmental Studies

Fall Term (2014-15)

DESCRIPTION

This course will explore ecological and evolutionary aspects of species invasions, with an emphasis on aquatic invaders. Course discussions will include such questions as: What is an invasive species? What factors influence the i) arrival of invaders to new regions, ii) their establishment success, and iii) their spread within the newly established region. Can we predict potential invasive species? How do we detect invaders? What impact do invaders have on resident communities? Is there evidence for local adaptation of resident species and/or invaders once an invasive species has established? How do other stressors influence the impact of invasive species on communities and ecosystems? Are there management strategies that can be employed to reduce the arrival, establishment, and spread of invasive species?
Recommendation BIOL 335

SCHEDULE
Seminar: Wednesday 10:00-11:30, Friday 8:30-10:00. BIOSC 2111

Instructor	**Dr. S. Arnott**
Instructor Contact	arnotts@queensu.ca Phone: 613-533-6384
Office Hours	Wed. 11:30-12:30
TA:	none
TA Contact Information	
Office Hours	

Learning Objectives

The goals of Biology 509 are to provide students with a comprehensive appreciation of ecological processes influencing the transport, establishment, spread, and impact of non-native species. There will be a particular focus on aquatic taxa.

Learning Hours

Teaching method		*Average hours per week*	*Number of weeks*	*Total hours*
In-class hours	Lecture	1.5	6	9
	Seminar	1.5	6	9
	Laboratory			
	Tutorial			
	Practicum			
	Group learning	1.5	12	18
	Individual instruction			

Other	Online activity			
	Off-campus activity			
	Private study	7	12	84
Total hours on task				120

Course Outline

1. Introduction to non-native species: definitions, terminology, scope of the problem
2. Transport vectors and pathways
3. Propagule pressure
4. Establishment success
5. Local spread of non-native species
6. Ecological impacts of non-native species

Weeks 7-12 will cover topics chosen by students. Examples include: Biological resistance, invasion meltdown, invader characteristics, hypotheses for invader success, dispersal, multiple stressor impacts, evolutionary responses, controlling introduction of non-native species, controlling spread of non-native species.

Textbooks/Readings

Invasive Species: What everyone needs to know. By Daniel Simberloff. 2013. Oxford University Press.

Selected readings from the primary scientific literature.

Grading Scheme

Component	Weight (%)	Date
Presentation	20	Weeks 7-12
Participation	20	Throughout course
One-page summaries	10	1 each week for weeks 2-6
Paper	10	FridayOctober 31
Reviews (2)	10	Friday November 14
Revised paper	30	Friday November 28

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/