

BIOL 533

Extremophiles

Fall Term

CALENDAR DESCRIPTION

How Organisms Cope Under Extreme Living Conditions

The course explores biology of extraordinary organisms that flourish under conditions that are unfavourable to life and how more ordinary organisms deal with periodically unfavourable circumstances. Emphasis is placed on understanding of the relevant adaptations and processes involved.

SCHEDULE

Lectures, etc.: Please see University Timetable

Instructor	Dr. D. Lefebvre
Instructor Contact	lefebvre@queensu.ca Phone: 613-533-6141
Office Hours	TBA

Learning Objectives

This course will provide a sound basis in how extremophiles have adapted to conditions which are unfavourable to life either as constant or temporary environmental condition.

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	10	30
	Seminar	0.5	4	2
	Laboratory	0	0	0
	Tutorial	0	0	0
	Practicum	0	0	0
	Group learning	1	12	12
	Individual instruction			
Other	Online activity	1	12	12
	Off-campus activity			
	Private study	5	12	60
Total hours on task				116

Course Outline

Introduction to Extremophiles

Biological adaptations to the following extreme conditions.

Temperature - thermophiles

Cold

Hot

pH – acidophiles and alkaliphiles

Alkaline

Acid

Water Availability - xerophiles

Desiccation Tolerance

Desiccation Avoidance

Metal – metallo-tolerance and hyperaccumulators

Metals

Metalloids

Salinity - halophiles

Osmolarity

Direct Effects of Salt Species

Textbooks/Readings

No textbook.

See website for lecture notes and assigned readings from scientific books, journals and selected websites.

Grading Scheme (Approximate)

Component	Weight (%)	Date
Class Participation	10	Throughout course
In-class Activities	20	Throughout course
Term Paper Outline	10	Week 4
Short Talks	10	Throughout course
Seminar	20	Throughout course
Term Paper	30	Last day of classes

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/>