

LAKEHEAD UNIVERSITY

Ontario Universities Program in Field Biology

Course Title:	Aquatic Ecology and Experimental Limnology	
Instructor(s):	Dr. Michael Rennie (mrennie@lakeheadu.ca) Dr. Joe Carney (jcarney@lakeheadu.ca)	
Dates:	August 20 – September 1, 2017	
Location:	The IISD-Experimental Lakes Area, Northwestern Ontario (1-807-226-5162). Students are responsible for arranging travel to and from ELA. IISD-ELA shuttle may be available from either Winnipeg or carpooling from Thunder Bay, please contact the course instructor for details.	
Cost:	<p>\$1500 (\$350 deposit to home university, \$1150 balance). NOTE: Up to six (6) academic / needs-based bursaries are available to Lakehead University students to help cover approximately 50% of course fees. Please contact the instructor for details.</p> <p>Includes: accommodations, meals, use of boats, research facilities and supplies.</p> <p>Balance: required by Aug. 1, 2017</p> <p>Cancellation and refund policy: No refunds on course fees if dropped.</p>	
Prerequisites:	<p>Previous courses in ecology and statistical analysis will be an asset.</p> <p>NOTE: All registrants in the course must be able to swim, be physically fit for hiking and possibly overnight camping. Students with a Pleasure Craft Operator's Card may be asked to operate boats with outboard motors.</p>	
Enrolment:	12 students (2 reserved for Lakehead)	
Description:	<p>This two-week field course provides a general background in limnology and aquatic ecology, and emphasizes the application of experimental ecology in helping address environmental issues related to water and aquatic resource management.</p> <p>Students will be introduced to common limnological sampling techniques, including sampling for basic parameters including temperature and oxygen; methods for collecting water at discrete depths for chemical analysis; collection and preservation methods for phytoplankton, zooplankton, invertebrates and fishes; organism identification, and capture-mark-recapture methods for estimating fish abundance. Students will be exposed first-hand to experimental methods in ecology, including whole-lake experiments and the opportunity to work with data from past experiments as part of their independent research projects.</p> <p>During the first day of the course, students will present a 20-minute seminar and provide a brief written summary on a pre-assigned topic in applied aquatic ecology, and propose an experimental approach that could effectively addresses the topic. Students will be assigned to research teams to conduct field experiments or comparative studies to address significant ecological questions. Each student must submit a scientific manuscript based on the data collected by the research team, one month after the course is completed.</p>	
Evaluation:	Presentation at beginning of course Field notebook Course/project participation Final presentation/Write up of field research project Animal Care approval and certification Quiz during field course	15% 15% 20% 40% 5% 5%

***\$350 Deposit is due at time of registration.

Tuition at your home institution is *in addition* to any field module costs.

Students who drop a field course should not expect a refund of any field course costs.

Students are encouraged to purchase cancellation insurance if airline tickets are required.

Students are responsible for all fees incurred by the home or host university due to any bounced cheque.

Instructors:

Dr. Michael Rennie, Lakehead University, IISD-ELA, University of Manitoba
Emma Lehmberg, Lakehead University
Dr. Michael Paterson, IISD-ELA, University of Manitoba, University of Winnipeg
Dr. Scott Higgins, IISD-ELA, University of Manitoba, University of Winnipeg
Dr. Vince Palace, IISD-ELA, University of Manitoba
Ken Sandilands, IISD-ELA

Meals: in hungry hall. Breakfast 7-7:45am, Lunch 12-12:45pm, dinner, 5:30-6:15 pm.

Sunday Aug 20th

2:00: Arrive at ELA; get settled in cabins
2:30: Orientation
3:00: Kitchen orientation
3:30: tour of facilities, presentation on ELA safety, ELA history.

5:30: dinner (barbecue)
7:00-9:00: student presentations (10 mins each, 5 mins for questions)

Lectures in classroom at back of chem lab unless otherwise noted

Groups

Group 1

Andrew Milling
Caleb Wong
Kirsten Spivak

Group 2

Cam Leitrants
Paige Cincio
Teresa Silverhorn

	Group 1	Group 2
Monday Aug 21	***solar eclipse peak @ 1:01 pm, 75%***	
8:00 am	<i>Lecture: Physical limnology</i> (Mike Rennie)	
9:15 am	Lab: Determining lake area, volume (Mike R)	Water Sampling, secchi, light, temp, DO, water, lake 239, 240 (Emma)
Pm	Water sampling, lake 227, 305 (Mike R)	Lab: Oxygen, Ammonia, spec (Emma)
evening	<i>Lecture: Nutrients</i> (Mike R, 6:30) <i>Lecture: Benthic invertebrates</i> (Mike R, 7:30)	
evening		Spectrophotometry for ammonia samples (Emma)

Tuesday Aug 22		
Am	Lab: Oxygen, Ammonia, spec (Emma)	Benthic invertebrate sampling (Eckman, Ponar, kick and sweep) (L239, 240) (Emma)
Pm	Benthic invertebrate sampling (eckman, ponar, kick and sweep) (L305, 227) (Mike R)	Lab: Determining lake area, volume (Mike R)
evening	Lecture: <i>zooplankton and pelagic food webs</i> (Mike Paterson, 6:30)	
Evening (8:30)	Spectrophotometry for ammonia samples (Emma)	Night sampling (L305, 227; S/P traps, vertical hauls; 9:30) Mike
Wed Aug 23		
Am	Zooplankton (S/P traps, vertical hauls) Emma (L227, L305)	Sorting benthos (Mike)
Pm	Sorting benthos (Mike)	Zooplankton (S/P traps, vertical hauls) L239, 240 Emma
4:30		
evening	<i>Schindler project presentations</i> (7:30) Hungry Hall	
Evening (after Schindler presentations)	Night sampling, L239, 240 (Mike)	
Thurs Aug 24		
Start thinking about projects!!!!		
8:00 am	<i>Review water chemistry data</i>	
9:00 am	Sort benthos, zooplankton	
1 pm	Lecture: <i>ecological modeling</i> (Scott Higgins)	
3 pm	Sort benthos, zooplankton	
evening	Lecture: <i>fish</i> (Mike R, 6:30)	
evening	Sort zooplankton	

Fri Aug 25		
Am	Beach Seine, L240	
Am	Lab: dissect fish, Prep. age structures (Mike R)	Lab: dissect fish, Prep. age structures (Mike R)
Pm	Lecture: <i>Benthic-pelagic coupling</i> (Mike R) 1:00 pm	
Pm	Sort remaining benthic/zoop samples	
evening	Sort remaining samples/ brainstorm project ideas	
Sat Aug 26		
Time to decide on a project!!!		
Am	Project proposal brainstorm 9:00 am	
Am	Lecture: Impacts of Hydro development on sturgeon and other fish (Andrew) 10:00 am	
	Lecture: Electrofishing as a method for fish capture (Cam) 10:45 am	
Pm	Review benthic, zooplankton data (1:30 pm)	
Pm	Read age structures	
Pm	Group meeting: proposals	
evening	Fire at Lake 240, relax	
Sun Aug 27		
field work begins/ proposal approval		
Am		
pm		
evening		
Mon Aug 28		
Am	Project field/lab work continues (coordinate with boats available)	
Pm	Hydrology demonstration (1:00 pm, Ken Sandilands, 240 outflow)	
Pm (1:30)	Project field/lab work continues (coordinate with boats available)	
evening	Hydrology lecture, exercise; Mike (6:30 pm)	

Tuesday Aug 29	
Last day for project field collection/lab work; working up data	
Am	
Pm	
Evening	Lecture: <i>Vince- toxicology</i> 6:30 pm

Wed Aug 30	Work up data; work on presentations	
Am		
Pm		
Evening		ELA seminar: <i>Effects of aquaculture on fish populations</i> (Mike R) Hungry Hall
Thurs Aug 31	Finish presentations!!!	
Am		
Pm		Presentations (15 minutes, 5 for questions)
Evening		Relax!!! You've earned it!
Friday Sep 1	Debrief after breakfast, pack, leave after lunch	