Department of Biology Course Outline

SC/BIOL 3280 4.0 Freshwater Biology
Fall Term 2019

Course Description

The study of physical, chemical and biological aspects of freshwater aquatic ecosystems, with a focus on lake systems. Laboratory deals with taxonomy of freshwater organisms, use of limnological equipment, and analysis/interpretation of aquatic data. Three lecture hours, three laboratory hours. One term. Four credits.

Prerequisites (strictly enforced)

Prerequisites: SC/CHEM 1000 3.0 and SC/CHEM 1001 3.0, SC/BIOL 2050 4.0, SC/BIOL 2060 4.0 or permission of the instructor. Note: SC/PHYS 1510 4.0 or similar (OAC Physics, 12U Physics) is strongly recommended. Exclusions: SC/BIOL 4080 3.0/4.0 or SC/ENVB 4080 3.0/4.0.

Course Instructor(s) and Contact Information

Course Director: Dr. Roberto Quinlan, rquinlan@yorku.ca
TA: Arnab Shuvo, arnab321@my.yorku.ca

Schedule

Lectures: MW 10.30- 12.00 pm, LSB 107
Labs: Mondays 2.30-5.30 pm, Lumbers 106

Evaluation

18% Three lab assignments (6% ea.)
12% Lab exam *or 7-9 page research essay topic*
18% Mid-term 1
22% Mid-term 2
30% Final exam

Important Dates

Midterm 01 – 02 October
Midterm 02 – 04 November
Assignment due dates – TBA

First class 04 September 2019
Last class 02 December 2019
Holiday (no class): Monday 13 October 2019
Fall reading term: 14-18 October 2019

Drop Deadline: 08 Nov 2019 (last day to drop without course on transcript)
Course Withdrawal Deadline: 09 Nov – 03 Dec 2019 (course still appears on transcript with 'W")

Resources

No required text. Suggested readings from "The Lakes Handbook: Limnology and Limnetic Ecology" (ISBN-10: 0632047976), available via hardcopy on course reserve at Steacie Library, or available on e-book via York University library catalogue.
Course Moodle website
Lab manual available via course Moodle website

Learning Outcomes

Last modified September 2015:
• Ability to properly and competently use limnological sampling equipment including a phytoplankton & zooplankton net tows, benthos D-net, and hand-held GPS unit. Depending on the feasibility of lab fieldwork, students will also be able to use a Schindler-Patalas trap, Ekman dredge, Secchi disk, Van-Dorn sampler, echo sounder, and a digital multiparameter sonde
• Interpretation and construction of isopleth diagrams of water column profile data and lake bathymetric data
• Interpret 1:50,000 topographic maps to delineate the watershed boundaries of water bodies
• Identify and enumerate major groups of algae, zooplankton, and benthos found in southern Ontario water bodies, including being able to identify benthos to a level equivalent to the Ontario Ministry of Environment's Benthos Biomonitoring Network (OBBN) rapid bioassessment protocols
• Knowledge of the properties of the water molecule, and its relevance to the biology, chemistry and physics of lakes, ponds and streams/rivers (hereafter referred to as "bodies of water")
• Knowledge of the different phenomena by which water basins form, the basic physical characteristics of bodies of water, and the basic hydrological properties of watersheds
• Knowledge of the properties of light and its relevance to the biology, chemistry and physics of bodies of water
• Knowledge of the patterns and dynamics of heat inputs/outputs to water bodies, their relevance to the thermal regime of water bodies, and influences on aquatic ecosystems
• Knowledge of physical water currents, and their relevance to the biology, chemistry and physics of bodies of water
• Knowledge of the patterns and dynamics of dissolved oxygen, salinity, nutrients (including phosphorus, nitrogen, and micronutrients), pH, and dissolved inorganic carbon in water bodies, and its influence on aquatic ecosystems
• Knowledge of the ecology of major groups of phytoplankton, zooplankton, and benthos, including their seasonal dynamics and the major environmental gradients that structure their communities, integrating knowledge of previous course topics on the chemistry and physical attributes of bodies of water
• Knowledge of the major concepts of the River Continuum Concept (RCC) [time permitting]
• Basic knowledge of the ecology of fish and waterfowl
• Basic knowledge of the structuring of aquatic food webs
• Knowledge of the functioning of high latitude (i.e. Arctic), saline, and shallow (i.e. polymictic) aquatic systems [time permitting]
• Integration of knowledge of previous course topics to understand the effect of eutrophication on aquatic ecosystems
• Integration of knowledge of previous course topics to understand the effect of acidification on aquatic ecosystems
• Integration of knowledge of previous course topics to understand the effect of recent climate change on aquatic ecosystems
• [Time permitting, other topics of interest involving very recent research in the primary literature]

Course Content

Course Topics

Physical limnology
Origin of Lake Basins
Lake Morphometry
Light
Heat and temperature
Movement of water within lakes

Chemistry
Dissolved oxygen
Salinity
pH and inorganic carbon
Nutrients – phosphorus, nitrogen, micronutrients

Biota
Phytoplankton
Zooplankton
Benthos
Fish, Birds, & Food Webs

Topics of interest and integrative topics
Arctic lakes
Saline lakes
Paleolimnology
Acidification damage to lakes
Eutrophication
Effects of global climate warming

Experiential Education and E-Learning

Other Information

Course Policies

Late assignments will be penalized by 30% per day. Assignments handed in after the required deadline on the same day are also considered late. If you miss a midterm you must inform RQ by email within 24 hours and submit the required paperwork within 5 calendar days. If you miss the final exam you must inform RQ by email within 48 hours and follow University policies for requesting deferred standing.

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - http://www.yorku.ca/academicintegrity/

Important A note from the Faculty of Science Committee on Examinations and Academic Standards: Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Student's in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - http://cds.info.yorku.ca/

Counselling & Disability Services at Glendon - https://www.glendon.yorku.ca/counselling/

York Accessibility Hub - http://accessibilityhub.info.yorku.ca/

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete and submit an Examination Accommodation Form at least 3 weeks before the exam period begins. The form can be obtained from Student Client Services, Student Services Centre or online at http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the

responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/