ORIGINAL COURSE IMPLEMENTATION DATE:	January 2013
REVISED COURSE IMPLEMENTATION DATE:	September 2022
COURSE TO BE REVIEWED (six years after UEC approval)**:**	January 2028

Course outline form version: 05/18/2018

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: BIO 335

Number of Credits: 4 Course credit policy (105)

Course Full Title: Freshwater Ecology

Course Short Title:

(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)

Faculty: Faculty of Science

Department (or program if no department): Biology

Calendar Description:

The study of inland waters including lakes, wetlands, rivers, and streams. Topics include the biotic components of freshwater ecosystems such as invertebrate and fish communities, the hydrology and geology of lake and stream systems, and the fundamentals of surface water chemistry and physics.

Note: This course is offered as BIO 335 and GEOG 335. Students may take only one of these for credit.

Prerequisites (or NONE):	BIO 210 or GEOG 202.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number: **BIO 421T**

Cross-listed with: **GEOG 335**

Dual-listed with:

Equivalent course(s): **GEOG 335**

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar hours	45
Tutorials/workshops	
Supervised laboratory hours	20
Experiential (field experience, practicum, internship, etc.)	25
Supervised online activities	
Other contact hours:	
Total hours	**90**

Labs to be scheduled independent of lecture hours: ☐ No ☒ Yes

Special Topics *(Double-click on boxes to select.)*

This course is offered with different topics:

☒ No ☐ Yes *(If yes, topic will be recorded when offered.)*

Independent Study

If offered as an Independent Study course, this course may be repeated for further credit: *(If yes, topic will be recorded.)*

☒ No ☐ Yes, repeat(s) ☐ Yes, no limit

Transfer Credit

Transfer credit already exists: *(See **bctransferguide.ca**.)*

☒ No ☐ Yes

Submit outline for (re)articulation:

☒ No ☐ Yes *(If yes, fill in transfer credit form.)*

Grading System

☒ Letter Grades ☐ Credit/No Credit

Maximum enrolment (for information only): 24

Expected Frequency of Course Offerings:

Once every two years *(Every semester, Fall only, annually, etc.)*

Department / Program Head or Director: Gregory Schmaltz	**Date approved:**	September 2021
Faculty Council approval	**Date approved:**	October 8, 2021
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	January 28, 2022

Learning Outcomes:

Upon successful completion of this course, students will be able to:

1. Describe the physical, chemical, biological, geographical and geological factors of inland waters and how these affect the distribution of organisms.
2. Synthesize the roles of chemistry and ecology in the health of freshwater ecosystems.
3. Describe the major components of freshwater ecosystems.
4. Design a research project in freshwater ecology.
5. Implement a research project in freshwater ecology.
6. Demonstrate proficiency in freshwater field techniques.
7. Analyze chemical and physical qualities of water samples.
8. Interpret chemical and biological data.
9. Predict water quality from empirical data.
10. Identify and describe the biotic community of freshwater streams.
11. Predict how human influence can impact freshwater ecosystems.
12. Examine indigenous management of freshwater resources.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion.)*

A combination of lectures, guest lectures, case studies, student presentations, written assignments, field trips, and laboratory exercises.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials *(If more space is required, download Supplemental Texts and Resource Materials form.)*

	Author (surname, initials)	Title (article, book, journal, etc.)	Publisher	Year
1.	Allan, Castillo et al.	Stream ecology: structure and function of running waters	Springer	2021
2.	Gordon, McMahon, Finlayson, Gippel, Nathan	Stream hydrology: an introduction for ecologists	Wiley	2004
3.	Hauer, Lamberti	Methods in stream ecology	Academic Press	2017
4.	Dodds,	Freshwater Ecology: Concepts and Environmental Applications	Academic Press	2019
5.				

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Use this section for supplies and materials for all sections of this course.

Typical Evaluation Methods and Weighting

Final exam:	35%	Midterm exam:	15%	Field experience:	%	Presentation:	5%
Final paper and presentation:	15%	Lab reports:	30%	Shop work:	%	Total:	100%

Details (if necessary):

Typical Course Content and Topics

- Overview of lakes, rivers, wetlands, ground water ecosystems
- River continuum
- Fresh water organisms: monera; plankton, invertebrates, and fish
- Introduction to aquatic food webs; students will collect stream invertebrates and identify them and place them in a food web
- Introduced and invasive species
- Primary and secondary production, dissolved oxygen, CO2; measurement of production
- Nutrient dynamics; anions: carbon, nitrates, phosphates, sulphates; cations: potassium, sodium, calcium, magnesium; students will measure nutrients and ions in Clayburn stream and compare it to Stoney Creek
- Causes and ecological implications of stratification and mixing
- Sediment and river cycles
- Applications: aquatic pollution; eutrophication, water treatment (domestic and sewage),
- Importance of water as a resource.

Labs: (conducted in the field)
Surface water chemistry: salinity and the bicarbonate buffering system, pH, alkalinity, and hardness
Terrestrial input: measuring dissolved and particulate organic carbon
Stream lab: fish and macroinvertebrate sampling in the field
Lake lab: zooplankton identification and enumeration
Student research projects (4 weeks)