



**Department of Geography & Environmental Management  
University of Waterloo**

GEOG 407 – Environmental Hydrology  
Winter 2020

Instructor: Drs. M.L. Macrae  
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Office Hours: W 1:00-2:00

Class: W 2:30-4:00pm, 9:30-10:50am  
Location: EV3 4412(Lec); EV1 134 (Lab)

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**Course Objectives:**

This course focuses on ecological and biogeochemical processes that are linked to the hydrological cycle and how these relate to the management of natural resources. The objectives of this interdisciplinary course are to explore topics that integrate ecosystem processes with physical hydrology, and examine the impacts of human activities on ecohydrological and hydrochemical processes. This course focusses on the storage and movement of water, solutes and nutrients within selected ecosystems, considering the biogeochemical consequences of human activity. ***Note: there is a significant field component to this course that will involve the sampling of water under cold conditions. It is imperative that students dress appropriately on these dates.***

**Student Evaluation:**

Lab 1	25%
Lab 2	30%
Final Exam	45%

**Course Reading:**

A copy of two textbooks (Schlesinger, W.H., Biogeochemistry, an analysis of global change (3<sup>rd</sup> edition) and Dingman, L., Physical hydrology) are on 3 hour reserve at the Porter library. Additional 'recommended' readings will be posted online throughout the term. In the lecture notes, I will list readings as required or recommended. If readings are ***required***, students are expected to have read them for the final exam.

<u>Week</u>	<u>Dates</u>	<u>Thursday lecture</u>	<u>Thursday lab</u>	<u>Deadlines</u>
1	Jan. 8, 9	Introduction, Overview Water Quality Issues in N. America	Safety/services & orientation of labs	
2	Jan. 15, 16	Watershed Hydrology Field and Lab Methods for Water Quality 1	Field Orientation (in lab)	
3	Jan. 22, 23	Watershed Hydrology	<b>Field orientation (in field) - gauging streams, collecting water samples</b>	
4	Jan. 29, 30	Biogeochemistry 101 (the basics)	Data Methods lab, working with example dataset (Lab 1)	
5	Feb. 5,6	Biogeochemistry 101 (the cycles)	<b>Collect water samples; analyze in lab</b>	
6	Feb. 12, 13	Runoff Generation in Watersheds and Biogeochemical Fluxes	<b>Collect water samples; analyze in lab</b>	Lab 1 Due
7	Feb. 19,20	<b>Reading week</b>		
8	Feb. 26, 27	Wetlands and In-stream Processes	<b>Collect water samples; analyze in lab</b>	
9	Mar. 4, 5	Impacts of Climate Change on hydrology and biogeochem: case study of subarctic and temperate peatlands	<b>Collect water samples; analyze in lab</b>	
10	Mar. 11, 12	Impacts of Land-use change on hydrology and water quality: I	Data Methods lab, working with class dataset (Lab 2)	
11	Mar. 18, 29	<b>Class Cancelled</b>		
12	Mar. 25, 26	Impacts of Land-use change on hydrology and water quality: II	no lab	Lab 2 Due
13	Apr. 1, 2	Exam Review Q&A Session	no lab	

◆ **Important Dates for Winter term:**

<http://ugradcalendar.uwaterloo.ca/page/uWaterloo-Calendar-Events-and-Academic-Deadlines> .

◆ **Field Trip Guidelines:**

Field trip guidelines are here: <https://uwaterloo.ca/environment/faculty-staff/policies-procedures-terms-reference/field-trip-and-field-work-guidelines>. Please be informed about UW's Driving Policy for the Use of Personal Vehicles for University Business: <https://uwaterloo.ca/finance/capital-assets/insurance/insurance-coverage>.

◆ **Intellectual Property:**

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

◆ **Academic Integrity:**

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. The University's guiding principles on academic integrity can be found here: <http://uwaterloo.ca/academicintegrity>. ENV students are strongly encouraged to review the material provided by the university's Academic Integrity office specifically for students: <http://uwaterloo.ca/academicintegrity/Students/index.html>

Students are also expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for their actions. Students who are unsure whether an action constitutes an offense, or who need help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group

work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. Students may also complete the following tutorial: <https://uwaterloo.ca/library/get-assignment-and-research-help/academic-integrity/academic-integrity-tutorial>

When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline: <https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71>. Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance: <https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>

◆ **Note for students with disabilities:** AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

◆ **Mental Health:** The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. **Please note that help is available.** Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services <http://www.uwaterloo.ca/counselling-services> is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

◆ **Religious Observances:** Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

◆ **Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. See Policy 70 - Student Petitions and Grievances, Section 4, [www.adm.uwaterloo.ca/infosec/Policies/policy70.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm). When in doubt please contact your Undergraduate Advisor for details.

◆ **Appeals:** A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) [www.adm.uwaterloo.ca/infosec/Policies/policy72.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm)

◆ **Unclaimed assignments:**

Unclaimed assignments will be retained until one month after term grades become official in quest. After that time, they will be destroyed in compliance with UW's [confidential shredding procedures](#).

◆ **Communications with Instructor and Teaching Assistants:**

All communication with students must be through either the student's University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

**Assignments:**

Working in small groups, students will choose a topic and collect water quality data over the course of the term. Students will conduct routine fieldwork for the collection of water samples on the University of Waterloo campus, and, will analyze their own water samples in the Ecology Lab (EV1). Following the lab, students will upload their data to the class portal.

**Lab 1 (25%)**

You will synthesize a series of water quality data sets and learn about key calculations and parameters used in water quality research.

**Lab Report 2 (30%)**

This lab will consist of a report on field hydrology and water quality data collected throughout the term. This technical report will consist of an Introduction, methods section, results section and discussion and Conclusions sections. You will be expected to synthesize the data that the class has collected in this report.

**Final Exam (45%)**

A final exam will be held during the exam period. This will be based on the lecture content throughout the term.