

ENVIRONMENTAL HYDROLOGY OF TERRESTRIAL ECOSYSTEMS WINTER 2023

GEOG 407

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CLASS SCHEDULE

| Section | Location | Time | Instructor(s) |
|---------------------------------------|----------|-------------------------------|---|
| GEOG 407 001 [SEM] | AL 211 | Fridays 1 p.m. - 2:20 p.m. | Merrin Macrae merrin.macrae@uwaterloo.ca |
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INSTRUCTOR / TA INFORMATION

Instructor: Dr. M.L. Macrae

Office: EV1 237

Email: mmacrae@uwaterloo.ca (mailto:mmacrae@uwaterloo.ca)

Office Hours: Tuesdays 9:30-10:30am

COURSE DESCRIPTION

Calendar Description for GEOG 407

This course focuses on ecological and biogeochemical processes that are linked to the terrestrial 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 within terrestrial systems. This course focusses on the storage and movement of water, solutes and nutrients within selected ecosystems (forests, agricultural, wetlands), considering the biogeochemical consequences of human activity such as climate change, wetland drainage, agriculture, and forest harvesting.

Prereq: GEOG 209 or EARTH 123; Level at least 3A

LEARNING OUTCOMES

No explicit learning outcomes defined for this course.

TENTATIVE COURSE SCHEDULE

| WEEK | DATE | LECTURE | LAB | DUE DATES |
|------|---------|--|-----------------------|---|
| 1 | Jan. 13 | Introduction, Overview Water Quality Issues in N. America <i>Read: Uploaded articles on Learn</i> | No lab this week | |
| 2 | Jan. 20 | Watershed Hydrology Field and Lab Methods for Water Quality <i>No readings this week</i> | No lab this week | |
| 3 | Jan. 27 | Watershed Hydrology <i>Read Dingman package on reserve at library</i> | Lab 1 Assigned | |
| 4 | Feb. 3 | Biogeochemistry 101 (the basics) <i>Read S&B pp 51-67; 99-117</i> | No lab this week | |
| 5 | Feb. 10 | Biogeochemistry 101 (the cycles) <i>Read S&B pp 141-153; 199- 232 + global cycles of N and P</i> | Lab 1 – Work Period | Lab 1 Due Feb. 13 at 8am EST (see Dropbox Link in Learn) |
| 6 | Feb. 17 | Runoff Generation in Watersheds and Biogeochemical Fluxes <i>Read: Uploaded articles on Learn</i> | Lab 2 Assigned | |
| 7 | Feb. 24 | Reading week | | |
| 8 | Mar. 3 | Wetlands and In-stream Processes <i>Read S&B Chapter 7</i> | No lab this week | |

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|----|---------|---|-----------------------|--|
| 9 | Mar. 10 | Impacts of Climate Change on hydrology and biogeochem: case study of subarctic and temperate peatlands <i>Read: Uploaded articles on Learn</i> | Lab 2 – Work Period | Lab 2 Due Mar. 13 at 8am EST (see Dropbox Link in Learn) |
| 10 | Mar. 17 | No Lecture this Week | Lab 3 Assigned | |
| 11 | Mar. 24 | Impacts of Land-use change on hydrology and water quality <i>Read: Uploaded articles on Learn</i> | No lab this week | |
| 12 | Mar. 31 | <i>Exam Review Q&A Session</i> | Lab 3 – Work Period | Lab 3 Due April 8 at 6pm EST (see Dropbox Link in Learn) |

TEXTS / MATERIALS

No materials required.

Copies of two textbooks (Schlesinger, W.H., and Bernhardt, E. Biogeochemistry, an analysis of global change (4th edition) and Dingman, L., Physical hydrology (Chapter 9) are on 3-hour reserve at the library. In the lecture notes, I will list readings as required or recommended.

STUDENT ASSESSMENT

| Component | Value |
|------------|------------------------|
| Labs | 60% (3 labs, 20% each) |
| Final Exam | 40% |

ASSIGNMENT SCREENING

No assignment screening will be used in this course.

ADMINISTRATIVE POLICY

Labs (20% each, = 60% of your grade) You will synthesize a series of water quality data sets and learn about key calculations and parameters used in water quality research. Late labs will have a penalty of 5% per day.

A final exam will be held during the exam period. This will be based on the lecture content throughout the term. The exam will consist of a series of multiple choice, and short and long essay-style questions.

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 <https://uwaterloo.ca/campus-wellness/> (<https://uwaterloo.ca/campus-wellness/>) 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.

All students are encouraged to download the WatSAFE app which is available free through the google and iOS app stores. The WatSAFE app provides on- and off-campus contacts for students in distress, including international students, and other information related to campus safety and security.

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.

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.

Recording lecture: Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course. If allowed, video recordings may only include images of the instructor and not fellow classmates. Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

UNIVERSITY POLICY

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. [Check [the Office of Academic Integrity](https://uwaterloo.ca/academic-integrity/) (<https://uwaterloo.ca/academic-integrity/>) for more information.]

Grievance: A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70>) . When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for their actions. [Check [the Office of Academic Integrity](https://uwaterloo.ca/academic-integrity/) (<https://uwaterloo.ca/academic-integrity/>) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71](#),

Student Discipline (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71>) . For typical penalties, check **Guidelines for the Assessment of Penalties** (<https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties>) .

Appeals: A decision made or penalty imposed under **Policy 70, Student Petitions and Grievances** (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70>) (other than a petition) or **Policy 71, Student Discipline** (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71>) may be appealed if there is a ground. A student who believes they have a ground for an appeal should refer to **Policy 72, Student Appeals** (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72>) .

Note for students with disabilities: **AccessAbility Services** (<https://uwaterloo.ca/disability-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.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.