

## University of Guelph | Department of Geography, Environment and Geomatics

### GEOG\*3610 Environmental Hydrology - Winter 2024

<b>Instructors:</b>	<b>email</b>	<b>office</b>	<b>Office hours</b>
Aaron Berg, Ph.D <b>Teaching Assistant:</b> Hunter Rusk	aberg@uoguelph.ca  ruskh@uoguelph.ca	Hutt 135  Hut 130	Tue 10-11/TBA  TBA

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#### **Method of Presentation:**

We will be meeting in person during our allotted class time.

#### **Calendar Description:**

An introductory course in hydrology, the study of water in the environment. Emphasis is placed on understanding and modeling the hydrologic cycle. Topics include hydrologic processes, water resources, and case studies of freshwater systems.

#### **Territorial Acknowledgements**

Acknowledging the territory on which we learn and work honours the relationship between lands/waters and the Indigenous ancestors and stewards of them. The University of Guelph rests on the traditional territory of the Attawanderon people. We therefore acknowledge the Attawanderon people and offer our respect to Anishinaabe, Haudenosaunee and Métis neighbours as the university and community strive to strengthen our relationships with them. We also recognize the significance of the Dish with One Spoon Covenant to this land. The Dish with One Spoon Covenant is a peace agreement made between Indigenous nations before the Europeans arrived. It characterizes our collective responsibility to each other and Mother Earth -we should take only what we need, leave enough for others and keep the dish clean.<sup>1</sup>

#### **Objectives and Learning Outcomes:**

This course is an introduction to the science of hydrology and the role of water in the global environment. In this course we will:

- a. Understand and quantify the fundamental hydrologic processes as outlined below.
- b. Analyze hydrological data sets to interpret hydrological processes.
- c. Simulate various components of the hydrologic cycle using simple process models.
- d. Develop an experimental framework for understanding hydrological concepts.
- e. Practice the communication of hydrological concepts in written and numerical formats.

#### **Prerequisites:**

Fifteen course credits. GEOG\*2000, GEOG\*2460, GEOG\*2110 or another 2<sup>nd</sup> year earth science or engineering course is recommended.

#### **Course Home Page:**

There is a course web page available on CourseLink. It will be your responsibility to closely monitor course webpage content throughout the semester.

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<sup>1</sup> This acknowledgement is adapted from the University of Guelph Indigenous Resource Centre and Student Life.

**Method of Evaluation:**

Assignments (4x5%). Due dates will be posted on CourseLink

Snow Project – term project (20%)

Mid-Semester Exam: 30% (Feb 13, 8:30-9:50 am)

Final Exam: 30% April 9 8:30-10:30am

**Course schedule of dates, and required reading (sections to focus on will be posted):**

Lecture #	Lecture Schedule	Reading Schedule: readings posted on CourseLink
1 -2	Hydrologic Cycle and Properties of Water	Reading1.pdf (fundamentals of hydrology) From: Gupta 2010. <i>Modern Hydrology and sustainable water development</i> . Wiley
3 -7	Precipitation, Interception and Snow	Reading2.pdf (precipitation measurement and observation) From: Shuttleworth. 2012. <i>Terrestrial Hydrometeorology</i> . Wiley Reading3.pdf (snowfall and snow cover) From: Barry and Gan. 2011. <i>The global cryosphere: past present and future</i> . Cambridge Univ. Press. Read section on interception from Reading6.pdf
8-11	Soil Moisture and Groundwater	Reading4.pdf (Storage) From: Davie. 2008 <i>Fundamentals of Hydrology</i> . Routledge. Reading5.pdf (measurement of soil moisture potential) From: Hillel. 1998. <i>Environmental Soil Physics</i> . Academic Press.
	<b>MIDTERM</b> (Material from Lectures 1-11)	<b>February 13 In class</b>
12 -15	Evaporation and Transpiration	Reading6.pdf (Evaporation, interception and transpiration). From: Brooks, Ffolliott and Magner. 2013. <i>Hydrology and management of watersheds</i> . Wiley.
16-20	Runoff and Hydrological Modelling	Reading7.pdf (Runoff generation and streamflow) From: Dingman. 2008. <i>Physical Hydrology</i> . Waveland Press.  Reading8.pdf (runoff processes and the modelling process) From: Bevan. 2012. <i>Rainfall-runoff modelling: the primer</i> . 2 <sup>nd</sup> ed. Wiley.
21-23	Droughts, Floods & Global Change	Reading9.pdf (changes to freshwater availability in Canada) From: Bonsal, et al. (2019): Changes in freshwater availability across Canada; Chapter 6 in Canada's Changing Climate Report, (ed.) E. Bush and D.S.Lemmen; Government of Canada, Ottawa, Ontario, p. 261–342.
<b>TBA</b>	<b>FINAL EXAM</b>	Material from Midterm to Final (11-22)
		<b>April 9 2025 8:30-10:30</b>

**Lectures**

Lectures will be provided each week at in our scheduled classroom and time (8:30-9:50 Tu/Th). After or just prior to class I will post a handout of the lecture slides.

**Readings**

Course readings listed will be available on CourseLink.

**Assignments**

Detailed assignment instructions will be posted on the course web page. The assignments will be related to the lectures of the previous week. Details on the term project will be posted.

## **Office Hours**

I will be available by appointment and on Tuesdays following class (10-11) to answer questions regarding the course material. Hunter will be available (TBA) to discuss questions related to assignments.

## **University of Guelph Policy Statements:**

### Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

### When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for **Academic Consideration**.

### Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for **Dropping Courses** are available in the Undergraduate Calendar.

### Copies of Out-Of-Class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

More information: [www.uoguelph.ca/sas](http://www.uoguelph.ca/sas)

## Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The **Academic Misconduct Policy** is outlined in the Undergraduate Calendar.

## Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## Resources

The **Academic Calendars** are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

## Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).