

Fundamentals of Hydrology Syllabus

Department of Earth and Environmental Sciences

ERTH/ENVS 3701 Fall 2026

Dalhousie University operates in the unceded territories of the Mi'kmaw, Wolastoqey, and Peskotomuhkati Peoples. These sovereign nations hold inherent rights as the original peoples of these lands, and we each carry collective obligations under the Peace and Friendship Treaties. Section 35 of the Constitution Act, 1982, recognizes and affirms Aboriginal and Treaty rights in Canada.

We recognize that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched the part of Mi'kma'ki known as Nova Scotia for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Dr. Christiane Zoghbi	christiane.zoghbi@dal.ca	W 9:00 - 10:00 a.m. R 9:00 - 11:00 a.m. Or by appointment LSC, 3rd Floor, Room 3085
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Course Description

This course is an introduction to physical hydrology – the science of the processes governing water availability, droughts, and floods. In this course we cover both the theoretical and applied approaches to Hydrology. Fundamental theoretical hydrology covered in this course focuses on processes and mechanisms of water storage and flow in the atmosphere, at the land/atmosphere interface, in soils, and in routing water through the landscape. Applied hydrology concepts in this class applies theoretical concepts as a basis for making informed decisions concerning water resource development and the impact of land cover change on water resources.

Course Prerequisites

MATH 1000.03 or MATH 1215.03 and one of ENVS 1000.06, SUST 1001.06, ERTH 1080.03, or ERTH1090.03, or one of SCIE 1502XY.21/SCIE 1504.27/ SCIE 1510XY.33, and completion of 2 years of an undergraduate degree. PHYC 1280.03 and 1290.03 (or PHYC 1300X/Y.06) and MATH 1010.03 are recommended.

Student Resources

The course instructor will be available during their office hours to discuss any questions regarding the lecture content and/or lab assignments.

Course Structure

Course Delivery

In-person. Lectures will not be recorded. Students are expected to attend all classes in person. If unable to attend, use the student declaration of absence form. For extended absences, contact the instructor and the Assistant Dean of Student Affairs.

Lectures

W, F 10:05-11:25 am LSC-BIOL&EARTH B8007

Laboratories

Four per term M 10:05-11:25 am Outdoor locations and/or LSC-COMMON AREA C334

Course Materials

- Textbook: Dingman, S.L., 2014, Physical Hydrology. Third Edition. Waveland Press, Inc. ISBN-13: 978-1478611189.
- The course syllabus, discussions, slides, laboratory instructions, announcements, assignments, out-of-text readings, and other pertinent information will be on the course Brightspace site. You are expected to check this site regularly.

Learning Objectives

Following active participation in this course you will be able to:

1. Explain the definition of hydrology.
2. Explain and use the fundamental dimensions, units, and physical laws of hydrology.
3. Explain what a watershed is, how to delineate it, and why it is the basic unit of hydrology.
4. Explain the components of the hydrological cycle and calculate the water balance and mean residence time using steady state box models.
5. Describe the mechanisms controlling how water moves through the land phase of the water cycle, both numerically and theoretically, in particular, the processes driving
 - a. Precipitation,

- b. Evapotranspiration,
 - c. Infiltration,
 - d. Groundwater, and
 - e. Runoff and Streamflow,
6. Manipulate and analyze hydrologic time series data.
 7. Make basic hydrologic field measurements and discuss the quality of common hydrologic measurements.

Assessment

Semester grades are based on:

Component	Weight (% of final grade)	Due Date (2026)
Midterm exam (70 minutes)	20	Oct 21
Lab Assignments (4)	32	Oct 2 & 30, Nov 20, Dec 8
Water Awareness Project	10	Ongoing
In-class participation & attendance	8	Ongoing
Final exam (2h)	30	Final Exam Period

Lab Assignments

There will be four laboratory assignments throughout the semester, conducted either in class or during field activities. Field-based labs may be rescheduled due to fire warnings, park closures, severe weather, or other unforeseen circumstances. Each laboratory assignment requires the submission of a professional scientific report. While collaboration is permitted, each student must submit their own original report unless otherwise specified. Students who work together must acknowledge their collaborators and include a statement confirming that all contributors participated equitably. All laboratory reports must be submitted through Brightspace; submissions sent by email will not be accepted.

Students are expected to follow the course guidelines regarding the use of Generative Artificial Intelligence (GenAI) tools. Before using GenAI for any laboratory assignment, please review the **GenAI Use in Coursework** section of this syllabus.

Lab	Assignment Date	Due Date
Lab 1 (In-class)	September 18, 2026	October 2, 2026
Lab 2 (Field Trip - Little Sackville River)	October 2, 2026	October 30, 2026
Lab 3 (Field Trip - Long Lake Park)	October 23, 2026	November 20, 2026
Lab 4 (In-class)	November 20, 2026	December 8, 2026

Midterm and Final Exams

The **midterm exam** (20% of final grade) will be held on **Wednesday, October 21** in class (duration: 70 minutes).

The course has a **final exam** weighing 30% of the total grade. It will take place during the **final exam period**.

Exams will contain a mix of multiple choice, short answer, paragraph-answer, calculation, and graph-and-draw questions. Drawings and diagrams on tests or lab reports must be completely labeled, legible, and precise. Points may be deducted for spelling, incomplete sentences (except where point form is specified) and other grammatical errors.

Water Awareness Project

The Water Awareness Project is worth **10% of the final course grade**. Throughout the semester, students will explore how the hydrological cycle influences communities around the world by identifying and analysing current water-related issues and events.

As each topic of the hydrological cycle is covered in class (e.g., precipitation, runoff, groundwater, flooding, drought), students will be asked to locate and evaluate **recent news stories or reports published within the past year** from reputable sources. Stories should focus on how communities are affected by hydrological processes and how societies, particularly vulnerable populations, respond to water-related challenges and disruptions.

The final project will synthesize these stories into a global perspective titled **“H₂O Stories from Around the World.”** Students may choose an appropriate format for their final product, such as an infographic, interactive map, website, etc...

Students will present their project to the class using either their selected format or a brief PowerPoint presentation. The project should demonstrate an understanding of hydrological concepts while highlighting the social, environmental, and economic impacts of water-related issues across different regions of the world.

Additional instructions, project milestones, and evaluation criteria will be provided during the term.

Other course requirements

Participation will be assessed based on your regular attendance and active engagement in class activities. This may include responding to multiple-choice questions during class, uploading problem solutions to Brightspace, or contributing to discussion forums on Brightspace.

Conversion of numerical grades to final letter grades follows the **undergraduate***

[Dalhousie Grade Scale](#)

(*for graduate courses, be sure to include the [graduate](#) grade scale)

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

- Assignments submitted late and without an approved extension will be deducted 10% per day.
- Extensions for assignments are granted for exceptional circumstances, using the Student Declaration of Absence Form. SDAs must be uploaded to Brightspace 24 hours before the assignment or exam due. The Student Declaration of Absence Form may be used **two times** this semester.
- Missed assignments: if you do not complete an assignment and do not submit a Student Declaration of Absence form, your mark on the assignment is zero.
- Missed quizzes: there will be no make-up quizzes. If you miss your quiz due to illness, family emergency, or other acceptable reason, the final exam will have a higher value (**50%**).
- A make-up date will be scheduled for the final exam, which may take place either before or after the semester break (i.e. January). As per University regulations, you may only write the make-up exam under exceptional circumstances:
"A student requesting an alternative time for a final examination will be granted that request only in exceptional circumstances. Such circumstances include illness (with a medical certificate) or other mitigating circumstances outside the student's control, including technology failure in the case of online examinations." For the full text, refer to the Undergraduate Academic Calendar 2026/2027: [Policy for the Scheduling of Courses/Examinations](#)

Course Policies related to Academic Integrity & Artificial Intelligence

Collaboration is an important part of learning; however, students are expected to maintain academic integrity in all course work.

Individual Assignments: Unless otherwise specified, all individual assignments must be completed independently. Students may discuss course concepts, theories, and assignment requirements with classmates, but the submitted work must be their own. Students may not share completed assignments, solutions, drafts, or substantive written work with other students.

Group Assignments and Projects: For assignments designated as group work, collaboration among group members is expected and encouraged. All group members are expected to contribute meaningfully to the final submission. Collaboration with individuals outside the assigned group is not permitted unless explicitly authorized by the instructor.

Students are responsible for understanding and adhering to Dalhousie University's Academic Integrity policies. Unauthorized collaboration, plagiarism, contract cheating, fabrication, falsification, and other forms of academic misconduct may result in disciplinary action.

Please note that Dalhousie University does not use plagiarism-detection software as a standard institutional service, and instructors do not use unsanctioned software or tools to investigate suspected academic integrity violations.

Use of Generative AI (Microsoft 365 Copilot Chat)

Generative artificial intelligence (AI) tools can support learning when used appropriately. In accordance with Dalhousie University guidance and Nova Scotia privacy requirements, students may only be required to use **Microsoft 365 Copilot Chat**, which is available through their Dalhousie account. The permitted uses of Copilot Chat in this course are as follows:

Activity	Permitted?
Brainstorming ideas and topics	Yes
Generating outlines or organizing content	Yes
Explaining concepts, terminology, or methods	Yes
Editing for grammar, spelling, clarity, or style	Yes
Producing complete assignment responses for submission	No
Writing substantial portions of papers, reports, reflections, or discussion posts that are submitted as the student's own work	No
Completing quizzes, tests, examinations, or other assessments intended to measure individual knowledge	No
Fabricating references, data, citations, or sources	No

Students remain fully responsible for the accuracy, quality, originality, and integrity of all submitted work, including any content developed with the assistance of generative AI.

Any use of generative AI beyond the permissions outlined above may be considered an academic integrity violation and may be subject to appropriate disciplinary and/or corrective measures.

Disclosure Requirements

If a student uses Microsoft 365 Copilot Chat in completing a course assessment, they must include a brief disclosure statement at the end of the submission:

I used Microsoft 365 Copilot Chat to assist with [describe purpose, e.g., brainstorming, outlining, editing for clarity, etc.]. All final content, analysis, conclusions, and submitted work are my own.

Citation Requirements

When Copilot Chat contributes substantive content, ideas, analysis, summaries, or wording that influence the final submission, students must acknowledge this use through an in-text citation and include a reference entry following the citation style required for the course (e.g., APA, MLA, Chicago).

Routine uses such as grammar correction, proofreading, or formatting assistance do not require formal citation but must still be disclosed if used during the preparation of the assignment.

Submission Requirements

For any assignment in which Copilot Chat is used, students must submit the following as an appendix or separate document:

- A copy of the prompts entered into Copilot Chat.
- A summary of how the tool was used during the assignment process.
- Any AI-generated content that directly informed or contributed to the final submission.

The instructor may request additional documentation of the student's process if needed to verify compliance with course requirements.

Students are encouraged to use generative AI thoughtfully, critically evaluate all AI-generated outputs, and apply their own judgment, analysis, and disciplinary knowledge in all submitted work.

Course Accessibility

Dalhousie University is committed to providing an accessible and inclusive learning environment. Students may be eligible for academic accommodations based on protected characteristics, including disability, religion, and other human rights grounds.

If religious, cultural, spiritual, or community-significant observances conflict with course requirements, please contact me as early as possible so we can work together to identify appropriate alternatives.

Students seeking formal academic accommodations should contact the Student Accessibility Centre (SAC) to begin the accommodation process. For more information, visit the SAC website: https://www.dal.ca/campus_life/academic-support/accessibility.html .

Course Content

Week	Date	Lesson Topic(s)	Reading	Assessment
1	Sep 9, 11	About the Course Basic Concepts & Challenges	Chapter 1	
2	Sep 16, 18	Basic Concepts & Challenges The Global Context: Climate, Hydrology, and the Critical Zone Lab 1: Mapping watershed boundaries, the water balance	Chapter 1 Chapter 2	
3	Sep 23, 25	Surface-Atmosphere Water and Energy Exchange – Principles and Processes	Chapter 3	
4	Oct 2	Lab 2: River monitoring and measurement (Field visit to Little Sackville River)		Lab 1 Due
5	Oct 7, 9	Precipitation	Chapter 4	
6	Oct 14, 16	Snow and Snowmelt	Chapter 5	
7	Oct 21, 23	MIDTERM Lab 3 Soil measurement (Field visit to Long Lake Park)		
8	Oct 28, 30	Evapotranspiration	Chapter 6	Lab 2 Due
9	Nov 4, 6	Principles of Subsurface Flow	Chapter 7	
STUDY BREAK				
10	Nov 18, 20	Infiltration and Water Movement in Soils	Chapter 8	Lab 3 Due
11	Nov 25, 27	Ground Water in the Hydrologic Cycle	Chapter 9	
12	Dec 2, 4	Runoff Generation and Streamflow	Chapter 10	
13	Dec 9	Course Review	Chapter 10	Lab 4 Due

Syllabus Appendix

(Formerly University Policies and Statements)

This course is subject to the academic policies, regulations, student support services, and university guidelines outlined in Dalhousie's **Syllabus Appendix**. Students are responsible for reviewing this resource, which includes information on academic integrity, student accommodations, equity and inclusion, student supports, and other important university policies. Because these resources are maintained centrally, the Syllabus Appendix provides the most current information available.

Link to Syllabus Appendix:

[Syllabus Appendix: Student Supports & University Statements, Policies, and Guidelines](#)