



# ENVS\*4030 Ecohydrology

Winter 2021

Sections(s): C01

School of Environmental Sciences

Credit Weight: 0.50

Version 1.00 - December 17, 2020

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## 1 Course Details

### 1.1 Calendar Description

This course introduces the emerging discipline of ecohydrology, which focuses on interactions and feedbacks between the elements of the water cycle, ecosystems and organisms. The emphasis will be on how hydrological processes regulate ecological ones but also on the mechanisms of ecological regulation of hydrological processes – which are often ignored in traditional hydrologic investigations. Students will learn about complex dynamics prevailing in ecohydrological systems using a blend of theory, quantitative tools and case studies. Students will also learn to synthesize recent literature, collect and analyze relevant data from open-access databases, and perform holistic ecohydrological system analysis through a term project.

Pre-Requisite(s): 1 of BIOL\*2060 or GEOG\*3610

AND 1 of GEOG\*2460 STAT\*2040 STAT\*2060 STAT\*2120 or STAT\*2230

Restriction(s): None

### 1.2 Timetable

Lecture: Tuesdays & Thursdays, 11:30 am-12:50 pm; Synchronous (AD-S; VIRTUAL)

Please note that class activities are planned as synchronous ones: this means that the instructor will give “live” lectures during which students are expected to take part in “live” interactive exercises. As much as possible, video recordings of lectures will be made available on CourseLink in case a student, exceptionally, cannot attend “live” lectures.

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## 2 Instructional Support

### 2.1 Instructor(s)

Genevieve Ali

Email: gali@uoguelph.ca

Telephone: +1-519-824-4120 x52740

Office: ECBL 2225

Office Hours: By appointment

## 2.2 Teaching Assistant(s)

Not applicable

## 2.3 Communicating with the Instructional Team

During the course, the instructor will interact with you (students) on various course matters using the following ways of communication.

**Announcements:** The instructor will use Announcements on the course website homepage (on CourseLink) to provide you with course reminders and updates, including last-minute changes. Please check this section frequently.

**Class time:** With synchronous activities being planned for this course, you will have unlimited access to the instructor for approximately 3 hours per week. The best time to interact with the instructor is therefore during that time.

**Email:** If you have a conflict that prevents you from completing course requirements, or have a question concerning a personal matter, you can send the instructor a private message by email. The instructor will attempt to respond to your email within 48 hours (weekends and holidays excepted).

**Video Call:** If you have a complex question you would like to discuss with an instructor, you may book a video meeting on Microsoft Teams. Video meetings will depend on the availability of the instructor and will be booked on a first come first served basis. If you require a video meeting, email the instructor.

**Please note that neither emails nor video calls should be used in lieu of attending synchronous class activities.**

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## 3 Learning Resources

### 3.1 Textbook and Electronic Device(s)

No textbook is required. Access to a personal computer (laptop or desktop) is required for the course.

### 3.2 Course Technologies and Technical Support

**CourseLink:** The course website is available via CourseLink. CourseLink (powered by D2L's Brightspace) is the University of Guelph's online learning management system (LMS). By using this service, you agree to comply with the University of Guelph's Access and Privacy Guidelines. Please visit the D2L website to review the Brightspace privacy statement and Brightspace Learning Environment web accessibility standards.

<http://www.uoguelph.ca/web/privacy/>

<https://www.d2l.com/legal/privacy/>

<https://www.d2l.com/accessibility/standards/>

You are responsible for ensuring that your computer system meets the necessary CourseLink system requirements. Use the browser check tool to ensure your browser settings are compatible and up to date (see links below).

<http://spaces.uoguelph.ca/ed/system-requirements/>

<https://courselink.uoguelph.ca/d2l/systemCheck>

If you need any assistance with the software tools or the CourseLink website, contact CourseLink Support.

*Email:* [courselink@uoguelph.ca](mailto:courselink@uoguelph.ca)

*Phone:* 519-824-4120 ext. 56939 Toll-Free (CAN/USA): 1-866-275-1478

*Support Hours (Eastern Time):*

Monday-Friday: 8:30 am–8:30 pm

Saturday: 10:00 am–4:00 pm

Sunday: 12:00 pm–6:00 pm

**Zoom:** This course will use Zoom for lectures. Check your system requirements to ensure you will be able to participate.

<https://opened.uoguelph.ca/student-resources/system-and-software-requirements>

Direct links to the Zoom virtual classroom will be posted on CourseLink (under Content → Modules → Zoom). Whenever possible, recordings of lectures will also be made available on CourseLink.

**Teams (via Office 365):** Office 365 Teams is a collaboration service that provides shared conversation spaces to help teams coordinate and communicate information. This course will use Teams for occasional one-on-one meetings with the instructor (see section 2.3 of this course outline). It is recommended that you use the desktop version of Teams. As a student, you are responsible for learning how to use Teams and its features.

For Teams support, visit the CCS website for more information.

<https://www.uoguelph.ca/ccs/services/office365/teams>

**Mentimeter:** Mentimeter is an online presentation software. The instructor will, occasionally, use Mentimeter to make lectures more interactive, notably to submit poll questions and ask you to provide your opinion on topics or case studies covered in class. As a student, you do not have to pay anything to access Mentimeter. You will just need an electronic device (i.e., desktop or laptop computer, cellphone or tablet) connected to the internet so as to access [www.menti.com](http://www.menti.com). Further instructions on the use of Mentimeter will be provided in class. It is recommended (although not required) that you use one electronic device (i.e., computer) for connecting to the Zoom classroom and another electronic device (i.e., secondary computer, cellphone or tablet) for accessing the Mentimeter interactive exercises built by the instructor.

### 3.3 Technical Skills

As part of your learning experience, you are expected to use a variety of technologies for assignments, lectures, and meetings. In order to be successful in this course, you will need to have the following technical skills:

- Manage files and folders on your computer (e.g., save, name, copy, backup, rename, delete, and check properties);
- Install software, security, and virus protection;
- Use office applications (e.g., Word, PowerPoint, Excel, or similar) to create documents;
- Be comfortable uploading and downloading saved files;
- Communicate using email (e.g., create, receive, reply, print, send, download, and open attachments);
- Navigate the CourseLink learning environment and use the essential tools, such as Dropbox, Quizzes, Discussions, and Grades;
- Access, navigate, and search the Internet using a web browser (e.g., Firefox, Edge); and
- Perform online research using various search engines (e.g., Google) and library databases.

Use online support resources if you need assistance with any of the above.

### 3.4 Netiquette Expectations

The course website is considered the classroom. The same protections, expectations, guidelines, and regulations used in face-to-face settings apply to the virtual classroom. Inappropriate behaviour will not be tolerated. Examples of inappropriate online behaviour include:

- Posting inflammatory messages about the instructor or fellow students;
- Using offensive language;
- Copying or presenting someone else's work as your own;
- Adapting information from the Internet without using proper citations or references;
- Buying or selling term papers or assignments;
- Posting or selling course materials to course notes websites;
- Having someone else complete your quiz or completing a quiz for/with another student;
- Stating false claims about lost quiz answers or other assignment submissions;
- Threatening or harassing a student or instructor;
- Discriminating against fellow students, instructors, and/or teaching assistants;
- Using the course website to promote profit-driven products or services;
- Attempting to compromise the security/functionality of the learning management system; and
- Sharing your username and password.

### 3.5 Lectures Notes and Library Access

Partial lecture slide decks (i.e., handouts in PDF format) will be posted on CourseLink, typically ahead of class activities. Students will be expected to take personal notes, as needed, about additional materials not included in the handouts. The instructor will provide links to interesting instructional videos, tutorials, websites and/or phone applications when appropriate. Google can also be a useful resource for this course.

As a student, you have access to the University of Guelph's library collection, including both physical and electronic materials. For information on checking out or couriering physical library items, accessing electronic journals and returning items to the library, visit the library website.

If you are studying off-campus and would like to access the library's electronic resources, use the Off-Campus Login option and log in, either by using your Single Sign-On credentials or by using your last name and library barcode.

<https://www.lib.uoguelph.ca/>

<https://www.lib.uoguelph.ca/campus-login>

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## 4 Specific Learning Outcomes

By the end of this course, you should be able to:

1. Conceptualize and write a water balance equation – accounting for water storages and fluxes – for any landscape setting on Earth (LO1)
2. Distinguish biotic from abiotic controls on hydrological processes (LO2)
3. Analyze and confront lines of evidence provided by different types of ecohydrological data (LO3)
4. Describe the underpinnings of basic ecohydrological theories and models (LO4)
5. Critically read and assess peer-reviewed literature (LO5)
6. Propose testable hypotheses regarding the impact of disturbances on the provision of hydrologically-oriented ecosystem services (LO6)
7. Use ecohydrological principles of complexity and stability to guide sustainable environmental management (LO7)

8. Further develop skills related to effective teamwork, oral communication and scientific writing (LO8)
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## 5 Teaching and Learning Activities

### 5.1 Lectures

The chosen topics covered by this course will be distributed across 9 modules. The schedule below is tentative; it may be adjusted through the term as needed.

Tuesday, January 12 – **Syllabus review** + What is ecohydrology?

Thursday, January 14 – Module #1: Landscapes and watersheds

Tuesday, January 19 – Module #2: Water cycle notions

Thursday, January 21 – Module #3: Precipitation and hydrologic abstractions

Tuesday, January 26 – Module #3: Precipitation and hydrologic abstractions

Thursday, January 28 – Module #4: Runoff generation

Tuesday, February 2 – Module #4: Runoff generation

Thursday, February 4 – **Quiz #1**

Tuesday, February 9 – Module #4: Runoff generation

Thursday, February 11 – **Introduction to critical reading**

Tuesday, February 16 – **Winter break - No class**

Thursday, February 18 – **Winter break - No class**

Tuesday, February 23 – Module #5: Stream hydrographs

Thursday, February 25 – Module #5: Stream hydrographs

Tuesday, March 2 – Module #5: Stream hydrographs

Thursday, March 4 – Module #6: Disturbance ecohydrology

Tuesday, March 9 – Module #6: Disturbance ecohydrology

Thursday, March 11 – **Quiz #2**

Tuesday, March 16 – Module #7: Environmental (ecological) flows

Thursday, March 18 – Module #7: Environmental (ecological) flows

Tuesday, March 23 – Module #8: Isotope ecohydrology

Thursday, March 25 – Module #8: Isotope ecohydrology

Tuesday, March 30 – Module #9: Ecohydrological modelling

Thursday, April 1 – **Quiz #3**

Tuesday, April 6 – **Term project presentations**

Thursday, April 8 – **Term project presentations**

### 5.2 Labs

Not applicable

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## 6 Assessments

### 6.1 Marking Schemes & Distributions

Online quizzes: 40%

Assignments: 40%

Term project (plan + presentation): 20%

### 6.2 Assessment Details

#### ***Quizzes #1, #2, and #3***

You will have to provide answers to three online quizzes (through the Quizzes tool with the Responds Lockdown Browser on CourseLink) that will each be 45 minutes in duration. Each quiz will have a range of questions (true/false, multiple-choice, short-answer) on topics recently covered in class. Those quizzes will be like mini-exams and will therefore require you to study your course materials regularly throughout the term. Specifically:

**Quiz #1 (February 4, starting at 11:30 am)** will focus on Modules #1, 2 and 3

**Quiz #2 (March 11, starting at 11:30 am)** will focus on Modules #1, 2, 3, 4 and 5

**Quiz #3 (April 1, starting at 11:30 am)** will focus on Modules #1, 2, 3, 4, 5, 6, 7 and 8

**Please note that online quizzes will have to be attempted on the days and times indicated above.** Those days and times were specifically chosen to coincide with class time, namely a time when all students are supposed to be available and do not have a scheduling conflict. At the end of the term, **only your two highest quiz marks (scores) will count**, each of them representing 20% of your overall course grade (for a total of 40%).

Students who are more than 20 minutes late will not be allowed to complete the online quiz. Also note that there will be no possibility for you to take a make-up quiz. If you miss a single quiz, you will receive a score of zero for it and it will be your lowest score; it will not affect your overall course performance too badly since only the two best quiz scores will count towards your overall course grade. It is suggested that you treat all three quizzes as if each of them counted; then, if a real emergency arises, or you just don't do very well on one of the three quizzes, you will still have the option to drop one score (your lowest).

#### ***Assignment #1, #2, and #3***

Assignments will focus on specific aspects of the course. They will involve either the analysis and interpretation of data (to be provided by the professor), or the critical reading and discussion of a published scientific paper. For each assignment, you will be expected to submit a typed report with your answers to the assignment questions. At the end of the term, **only your two highest assignment marks (scores) will count**, each of them representing 20% of your overall course grade (for a total of 40%).

#### ***Term project***

Regardless of whether they work for the government, for a private industry or in academia, ecohydrologists need to master a range of skills. Two of the main skills in demand by employers are: i) assessing changing ecohydrological dynamics in response to disturbance events, and ii) communicating the results of disturbance assessments to stakeholders. Disturbance events can be quite variable in nature and intensity (e.g., wildfires, droughts, logging, insect infestations, dam or road construction, landslides, earthquakes, volcanic eruptions, resource extraction (e.g., coal mining), climate change-induced permafrost thaw, etc.), leading to different impacts on runoff

generation, streamflow regime, plant growth and health and aquatic life. The goal of the term project (20% of your overall course grade) is to have you focus on a particular disturbance and its effects on one (or multiple) ecohydrological process (processes).

You will work in teams of two students (or three, exceptionally, if the class size is an odd number) and go through the following steps:

**Step 1:** Pick one type of disturbance that you are interested in.

**Step 2:** Perform a small literature review, focusing on two (2) to four (4) papers that have assessed the impacts of your chosen disturbance on ecohydrological dynamics at one or multiple locations.

**Step 3:** Prepare a **project plan**, i.e., a short document (maximum 500 words) in which you will highlight the disturbance that you have chosen to focus on and why, together with providing a list of the two to four papers you have elected to read. The project plan is **mandatory**: it is due on **February 11** and will be worth 5% of your overall course grade.

**Step 3:** Critically read your chosen papers, following critical reading guidelines provided in class.

**Step 4:** Prepare an **oral presentation** summarizing the outcomes of your literature review. Your team will submit your presentation slides to the instructor and deliver an oral presentation to the whole class on either **April 6 or April 8**. All team members are required to take part in their team's oral presentation, which will count towards 15% of each student's overall course grade.

Further information about project scope, journal paper selection, critical reading tips and oral presentation templates will be discussed in class in advance of the various due dates.

### 6.3 Dropbox Submissions

Assignments and oral presentation slides should be submitted electronically via the online Dropbox tool available from CourseLink. When submitting your work using the Dropbox tool, do not leave the page until your file(s) has (have) successfully uploaded. To verify that your submission was complete, you can view the submission history immediately after the upload to see which files uploaded successfully. The system will also email you a receipt: save this email receipt as proof of submission.

If, for some reason, you have a technical difficulty when submitting your work electronically, please contact either the instructor or CourseLink Support.

<http://spaces.uoguelph.ca/ed/contact-us/>

### 6.4 Grades and Feedback

The instructor will attempt to have assessment feedback posted online within 2 weeks of each submission deadline. The instructor will review your assignments and return, to you, an annotated version of the file that you originally submitted. Your grade will therefore be written directly on the annotated version of your submitted file. However, please note that your grades for individual assessments will **not** be entered in the Grades tool of the course website.

At the end of the term and after the final exam period has ended, as a University of Guelph student you will be able to access your final course grade by logging into WebAdvisor (using your U of G central ID).

<https://webadvisor.uoguelph.ca>

## 7 Course Statements

### 7.1 Communication

You are required to check your uoguelph email on a regular basis, as important messages related to this course may be sent from Courselink. You are also required to check the course website (Courselink) regularly for special announcements and new documents to download. The course instructor will do her best to answer emails within 48 hours (weekends and holidays excepted). However, students should remember that the best time to communicate with the instructor is during class time, especially for project-related questions.

### 7.2 Group work

While you can talk to fellow students about course assignments, the work that you submit through CourseLink should be your own. Assignments that appear similar may be subject to an academic misconduct investigation led by the School of Environmental Sciences and the Ontario Agricultural College.

### 7.3 Late work

**All assignments and oral presentation slides are to be submitted to the instructor, via CourseLink (Dropbox, see section 6.3 of this course outline), on or before the due date.** Email submissions will **not** be accepted unless agreed upon ahead of time with the instructor. All late work will receive a 10% deduction for each day, or part thereof, that they are late, up to a limit of five (5) days. Work that is 6 days late or more is guaranteed to receive a failing grade. Extensions will only be considered for medical reasons or other extenuating circumstances, provided that they are discussed with the instructor well before the due date. Extensions will not be granted once the due date has passed.

You should remember that a technical difficulty is not a valid excuse to turn in an assignment late. Don't wait until the last minute as you may get behind in your work. Be sure to keep a back-up copy of all your assignments: to avoid any last-minute computer problems, save your assignments to a cloud-based file storage (e.g., Google Docs, OneDrive) or send copies to your email account so that should something happen to your computer, your assignment can still be submitted on time or re-submitted. Please note that these rules are not designed to be arbitrary, nor are they inflexible: they are designed to keep you organized, to ensure that all students have the same amount of time to work on assignments, and to help the instructor return marked materials to you in the shortest possible time.

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## 8 University Statements

### 8.1 Email Communication

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

### 8.2 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. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>



Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

### **8.3 Drop Date**

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

### **8.4 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.

### **8.5 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 book their exams at least 7 days in advance and not later than the 40<sup>th</sup> Class Day.

For Guelph students, information can be found on the SAS website

<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website

<https://www.ridgetownnc.com/services/accessibilityservices.cfm>

### **8.6 Academic Integrity**

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 encourages academic integrity. 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.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## **8.7 Recording of Materials**

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

## **8.8 Resources**

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

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

## **8.9 Disclaimer**

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

## **8.10 Disclaimer**

The University will not require verification of illness (doctor's notes) for the fall 2020 or winter 2021 semesters.

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