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-Requisites: (BIOL*3130 or GEOG*3610), (1 of GEOG*2460, STAT*2040, STAT*2060, STAT*2120, STAT*2230)

1.2 Timetable

Lecture: Tuesdays & Thursdays, 8:30 am-9:50 am; AD-S; VIRTUAL or MCKN, Room 315

Students are expected to attend class twice a week to listen to lectures, participate in interactive exercises and make the most of data analysis tutorials, critical reading tutorials, or modelling tutorials when applicable. Depending on the epidemiological situation during Winter 2022, class activities may occur either fully online (AD-S, virtual) if the University directive is a shift to remote course delivery, or fully in-person (in the classroom, MCKN 315) if the University directive is a return to in-person instruction. Critical updates regarding the course delivery mode will be provided via the course website (i.e., CourseLink, see details in section 2.3). Should the course delivery mode be conventional, in-person instruction, please note that video recordings of in-person class activities will not be made available on CourseLink.
1.3 Final Exam

There is no final exam for this course.

2 Instructional Support

2.1 Instructional Support Team

Instructor: 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 Instructor

During the course, the instructor will interact with you 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. Please check this section frequently for course updates from your instructor.

**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**: This option for communication will only be available if we pivot to online learning and no in-person class activities are taking place. In the advent of online-only teaching, if you have a complex question you would like to discuss with the 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 your instructor.

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

3 Learning Resources

3.1 Required Resources
Textbook and Electronic Device(s) (Equipment)

No textbook is required. A list of (required and/or optional) readings will be posted on CourseLink throughout the term. Access to a personal computer (laptop) is required for the course.

Course Technologies and Technical Support (Software)

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

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

In the advent that in-person class activities are cancelled, and we pivot to online learning, this course will use Zoom for lectures. Check your system requirements to ensure you will be able to participate.
Direct links to the Zoom virtual classroom will be posted on CourseLink (under Content -> Modules -> Zoom).

**Teams (via Office 365)**

In the advent that in-person class activities are cancelled, and we pivot to online learning, this course will use Teams for occasional one-on-one meetings with the instructor (see section 2.3 of the course outline). Office 365 Teams is a collaboration service that provides shared conversation spaces to help teams coordinate and communicate information. 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.

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. Further instructions on the use of Mentimeter will be provided in class. In case we pivot to online-only learning, 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.

**Technical Skills (Other)**

As part of your learning experience, you are expected to use a variety of technologies for assignments, lectures, teamwork, 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.

**Netiquette Expectations (Other)**
The course website is considered the classroom. The same protections, expectations, guidelines, and regulations used in face-to-face settings apply to the course website and to the virtual classroom (in the advent that we pivot to online learning and lectures are delivered through Zoom). 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 TAs;

-> Using the course website to promote profit-driven products or services;

-> Attempting to compromise the security or functionality of the learning management system; and

-> Sharing your username and password.

### 3.2 Additional Resources

**Lecture Notes and Library Access (Readings)**
Partial lecture slide decks (i.e., handouts in PDF format) will be posted on CourseLink, typically ahead of class activities. Students are 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 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

4 Learning Outcomes

4.1 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 oral communication and scientific writing (LO8)
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 11 – Syllabus review + What is ecohydrology?

Thursday, January 13 – Module #1: Landscapes and watersheds

Tuesday, January 18 – Module #2: Water cycle notions

Thursday, January 20 – Module #3: Precipitation and hydrologic abstractions

Tuesday, January 25 – Module #3: Precipitation and hydrologic abstractions

Thursday, January 27 – Module #4: Runoff generation

Tuesday, February 1 – Module #4: Runoff generation

Thursday, February 3 – Mini-exam #1

Tuesday, February 8 – Module #4: Runoff generation

Thursday, February 10 – Module #5: Stream hydrographs

Tuesday, February 15 – Module #5: Stream hydrographs

Thursday, February 17 – Module #5: Stream hydrographs

Tuesday, February 22 – Winter break - No class

Thursday, February 24 – Winter break - No class

Tuesday, March 1 – Introduction to critical reading

Thursday, March 3 – Mini-exam #2

Tuesday, March 8 – Module #6: Disturbance ecohydrology

Thursday, March 10 – Module #6: Disturbance ecohydrology

Tuesday, March 15 – Module #7: Environmental (ecological) flows

Thursday, March 17 – Module #7: Environmental (ecological) flows
Tuesday, March 22 – Module #8: Isotope ecohydrology

Thursday, March 24 – Module #8: Isotope ecohydrology

Tuesday, March 29 – Module #9: Ecohydrological modelling

Thursday, March 31 – **Mini-exam #3**

Tuesday, April 5 – **Critical reading presentations**

Thursday, April 7 – **Critical reading presentations**

5.2 Labs

Not applicable

6 Assessments

6.1 Marking Schemes & Distributions

   Mini-exams: 40%

   Assignments: 40%

   Critical reading presentation: 20%

6.2 Assessment Details

   **Mini-exams #1, #2, and #3**

   You will have to write three in-class mini-exams that will each be 60 minutes in duration. If we pivot to online-only learning during the Winter 2022 term, some or all of those mini-exams will be set-up online as well (through the Quizzes tool with the Responds Lockdown Browser on CourseLink). Each mini-exam will have a range of questions (true/false, multiple-choice, short-answer) on topics covered in class. Those mini-exams will be cumulative and will therefore require you to study your course materials regularly throughout the term. Specifically:

   **Mini-exam #1** (February 3, starting at 8:30 am) will focus on Modules #1, 2 and 3

   **Mini-exam #2** (March 3, starting at 8:30 am) will focus on Modules #1, 2, 3, 4 and 5

   **Mini-exam #3** (March 31, starting at 8:30 am) will focus on Modules #1, 2, 3, 4, 5, 6, 7 and 8

   At the end of the term, only your two highest mini-exam 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 a mini-exam, regardless of whether it is an in-class mini-exam or an online mini-exam. A missed mini-exam will result in a mark (score) of 0, and make-up exams will not be given except under exceptional circumstances. If you miss a single mini-exam, 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 mini-exam scores will count towards your overall course grade. It is suggested that you treat all three mini-exams 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 mini-exams, you will still have the option to drop one score (your lowest).

**Assignments #1 and #2**

Assignments will focus on specific aspects of the course. Both of them will involve the analysis and interpretation of data (to be provided by the professor), and/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. Completing both assignments is mandatory. Each assignment will represent 20% of your overall course grade (for a total of 40%).

**Assignment #1**: Instructions will be provided on January 20. The assignment will be due on January 27.

**Assignment #2**: Instructions will be provided on February 17. The assignment will be due on March 10.

**Critical reading presentation**

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 critical reading presentation (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 individually 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 and pick one (1) paper (from a reputable, peer-reviewed journal) that has assessed the impacts of your chosen disturbance on ecohydrological processes at one or multiple locations.

**Step 3**: Prepare a **presentation 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 the full bibliographic reference of the paper you have elected to read. The project plan is mandatory: it is due on **February 17** and will be worth 5% of your overall course grade.

**Step 4:** Critically read your chosen paper, following critical reading guidelines provided on CourseLink and in class.

**Step 5:** Prepare an **oral presentation** summarizing the outcomes of your critical reading exercise. You will submit your presentation slides to the instructor and deliver an oral presentation to the whole class on either **April 5 or April 7** (exact timing of individual presentations TBD).

**In detail:** you will need to prepare a **5-minute presentation** that includes, at the minimum, the following:

--> A description of what the goal(s) of your chosen paper is (are)

--> An explicit identification of the ecohydrological processes alluded to in the paper (in relation to topics covered in class), and the disturbance(s) examined in the paper

--> A short summary of what the main findings, conclusions or opinions reported in the paper are. It is strongly suggested that your summary not be only textual but also include either original figures and tables from the paper, or a graphical abstract of your own making (for more information about graphical abstracts, see: https://www.elsevier.com/authors/tools-and-resources/visual-abstract)

--> A discussion of at least one thing that you liked in the paper, and one thing that you did not like and that you would have presented differently if you had been the one writing the paper.

Your critical reading presentation will count towards 15% of your overall course grade.

Please note that no extra work will be accepted as a substitute for the aforementioned assessments in this course.

### 6.3 Dropbox Submissions

Assignments and presentation slides should be submitted electronically via the online Dropbox tool available from CourseLink. When submitting your assignments or presentation slides using the Dropbox tool, do not leave the page until your work has 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 assignment electronically, please contact the instructor or CourseLink Support.
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. Written feedback will also be provided via CourseLink after the critical reading presentations.

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

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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.

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.

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
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 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.

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.ridgetownc.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.
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, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. 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 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).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

• https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/
• https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.