# Biology 346 Freshwater Ecosystems Winter 2025

We acknowledge and respect the Lək<sup>w</sup>əŋən (Songhees and Esquimalt) Peoples on whose territory the university stands, and the Lək<sup>w</sup>əŋən and WSÁNEĆ Peoples whose historical relationships with the land continue to this day.

### Instructors:

Lecturer: Dr. Rana El-Sabaawi (She/her) (<u>rana@uvic.ca</u>) Office hours: Mondays 1:00 to 2:00 in Cunningham 066 (Rana's office is at the back of the lab) or email for appointment

TA: TBA

**Brief description**: This course provides a foundational understanding of the geological, physical, chemical, and biological processes that form and maintain lake and reservoir ecosystems. It covers theoretical and applied aspects of freshwater ecology, and discusses studies and experiments that have been used to test important theories and applications. It also covers anthropogenic and environmental threats and impacts on freshwater ecosystems.

Some of the topics covered include:

- 1. Lake morphology and geological origin
- 2. The water cycle of lakes and rivers
- 3. Nutrient cycles of lakes and rivers
- 4. Food webs of lakes and rivers
- 5. Human impacts including pollution and climate change
- 6. Ecology and management of lake and stream ecosystems

#### Learning outcomes:

By the end of the course you will have an excellent foundational understanding of ecosystem processes in lakes and rivers. You will understand how lakes and rivers are formed geologically, and how they vary seasonally in terms of their biology, chemistry, and physics. You will also be able to describe how they might vary in the future under different human impact scenarios. You will also develop quantitative intuition by studying various calculations and metrics used in freshwater ecosystems. An emphasis in this course will be on putting ideas from different parts of the course together. For example, if we know a bit about a river's hydrology, what can we predict about its food web structure?

Examples of specific outcomes:

- You will understand the jargon used to describe aquatic ecosystems
- You will be able to produce and interpret a variety of scientific figures related to lakes and rivers, and to extrapolate from these figures a broader picture of the ecosystem. Examples of these figures include depth profiles of water and sediment, morphometric figures, hydrographs, light transmission profiles, etc.

- You will be able to critically interpret the results of experiments at different scales
- You will develop your quantitative acumen for aquatic ecosystems. You will learn how calculate and interpolate various ecosystem metrics, and how to interpret them and relate them to hypotheses.
- You will learn how to develop hypotheses and predictions for ecosystem change in lakes and rivers based on foundational knowledge

Making scientific figures, interpreting scientific figures, and calculations are an important part of this course. If you have concerns about meeting learning objectives please let the instructor know immediately.

### **Expectations**:

- Students must have facility with basic arithmetic operations, especially those relating to
  metric unit conversions of distance and volume, logarithms, slopes, fractions, and
  ratios. Students should also be familiar with basic area (circle, rectangle) and volume
  calculations (e.g. spheres, cubes, and cylinders). <u>It the student's responsibility to review
  this material.</u>
- Students should understand the differences between different types of scientific figures, and how they are plotted (e.g. x-y figures, bar charts, box plots, etc). For example, students should know the difference between continuous and categorical data, as well as independent vs. dependent variables in an x-y figure
- Occasionally we will encounter basic chemical calculations or equations that involve moles, concentrations, etc. It is a good idea to review these concepts when we get to them.
- Students are expected to be able to write clearly and coherently on exams and assignments. If the instructor cannot understand your answer, then they cannot give you a grade.
- Students are expected to attend class, to keep up with class materials, and to ask the instructor if anything is unclear.

## Logistics:

*Communication*: All course information including lectures PDFs will be posted on Brightspace. Please ensure that the email that use for Brightspace is the one you check most frequently. *There is no textbook for this class. All course materials will be posted on Brightspace as needed.* 

*Lecture schedule* is M and Thursday 10:00 AM PST – 11:20 AM PST (MacLaurin Building Room: D288)

*Lectures* will be delivered in-person. Whenever possible in-person lectures <u>will be recorded</u> using Echo360 to accommodate students who are not able to attend because of illness or other circumstances. If you have other questions or concerns regarding class recording and

privacy please contact <u>privacyinfo@uvic.ca.</u> The recordings will be posted in Brightspace. Some in class activities such as discussions or group exercises may not be recorded.

Note that recording technologies can fail, and there is no guarantee that any lecture will be recorded successfully. In other words, do not rely on videos as your primary methods for attending class.

### Evaluation:

Weekly Brightspace quizzes (10%) These multiple choice quizzes are meant to help you keep track of the material. They are open book, untimed, and graded as a participation grade (meaning that you get full marks for completing the quiz). Quizzes will open on Thursdays (starting Jan 13<sup>th</sup>) after class, and will be available until Sunday at midnight. They will appear on the calendar portion of the Brightspace page. <u>It is your responsibility to keep track of the quiz deadlines. There are no make-up quizzes</u>.

*Midterm 1* (25%) **Monday 03 Feb** during class time: This written <u>in-person</u> midterm will cover all lectures up to the date of the midterm. It will be a closed book exam, but students are allowed 1 double-sided sheet of handwritten notes (i.e. a "reference sheet").

*Midterm 2* (25%) **Monday 10 March** during class time. This written <u>in-person</u> midterm will cover all lectures between the last midterm and March 6<sup>th</sup>, and might draw on some material from the first part of the class. The instructor will share more information closer to the date. It will be a closed book exam, but students are allowed 1 double-sided sheet of handwritten notes (i.e. a "reference sheet").

*Final Exam* (40%): The final exam will be an <u>in-person, cumulative, closed book exam</u>, to be scheduled during the final exam period. Students will be allowed two double-sided sheets of handwritten notes (i.e. 4 pages of reference sheets total).

### Medical absences and missed exams:

Medical documentation for short-term absences is not required (as approved by UVic Senate). If a student misses the midterm, a <u>deferred midterm will be offered in the following week</u>. Students must attempt both midterms and the final for coursework to be considered complete. Otherwise a grade of N will appear on the transcript.

If illness, accident, or family affliction causes a student to miss the final exam students are required to submit a request for academic concession, with associated documentation, as outlined in the UVic Calendar (<u>https://www.uvic.ca/registrar/students/appeals/acad-concession/index.php</u>).

A note on accessibility: If you are registered with the center for accessible learning (CAL, <u>https://www.uvic.ca/services/cal/</u>), or have any concerns about barriers to success, please discuss them with us as soon as you can.

## Academic regulations:

1. VERY IMPORTANT: UVic's policy on academic integrity (https://tinyurl.com/ycjeyumu)

2. Know your responsibilities as outlined in the calendar (<u>https://tinyurl.com/y3o8q586</u>)

3. The Center for Accessible Learning is here to help (https://www.uvic.ca/services/cal/)

4. Grades are assigned on a percentage scale in accordance with UVic policy as outlined in the calendar (<u>https://tinyurl.com/y7qydfyy</u>)

5. All course content and materials are made available by instructors for educational purposes and for the exclusive use of students registered in their class. The material is protected under copyright law, even if not marked with a ©. Any further use or distribution of materials to others requires the written permission of the instructor, except under fair dealing or another exception in the Copyright Act. Violations may result in disciplinary action under the Resolution of Non-Academic Misconduct Allegations policy (AC1300). Students may not distribute lecture notes or any exams or quizzes from the course without permission of the instructor, and to do so, through note-sharing sites or other means, violates the Policy on Academic Integrity Please read UVic's policy on copyright (<u>https://www.uvic.ca/library/featured/copyright/</u>) 6. Important UVic dates including dates for adding and dropping course, holidays, etc. (https://www.uvic.ca/calendar/dates/)

7. Please read UVic's policy on plagiarism

(https://www.uvic.ca/library/research/citation/plagiarism/index.php)

8. Important academic dates including add and drop dates can be found on the UVic website (<u>https://www.uvic.ca/calendar/dates/</u>)