Aquatic Ecology 3415G Winter 2025 Course Outline

1. Course Information

Course Information

Aquatic Ecology 3415G, Winter 2025
Lectures: Mondays (10:30–11:30 AM) and Wednesdays (9:30–11:30 AM)

List of Prerequisites

Biology 2483 A/B.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructors	Email	Office	Office Hours
Holly Deighton (Instructor)	hdeight@uwo.ca		Wednesdays 11:30-12:30 pm, e-mail to schedule another time if needed
Kevin Adeli (TA)	kadeli2@uwo.ca		

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

3. Course Syllabus, Delivery Mode, Schedule

This course examines water as a habitat for life and the ecology of freshwater and marine environments. In particular, we will examine the role of aquatic ecosystems in global and local biogeochemical cycles, including climate change, ocean acidification, and eutrophication. Emphasis will be placed on the protists, bacteria, viruses that make up the bulk of the biomass in aquatic environments.

Course-level Learning Outcomes
Students will be able to:

- Determine the distribution of water on Earth, where water goes, what kinds of water there are, and why aquatic environments are important
- Describe how temperature, salinity, and water density structure the environments where aquatic life lives
- Understand what nutrient are important to aquatic life, especially in regulating the rate of primary productivity and making biochemistry possible
- Familiarize themselves with vocabulary used to describe life in water
- Understand and use Reynolds number, as well as describe how the size and swimming speed of an organism affects how it experiences water, and how plankton have adapted to living in water
- Determine the distribution of biomass in aquatic ecosystems and the autotrophs that first produce this biomass, in particular the diverse photosynthetic organisms and their evolutionary history
- Recognize the factors that affect primary productivity in aquatic ecosystems, particularly phytoplankton bloom dynamics, and understand the diversity of harmful algal blooms and their increasing frequency
- Describe the dominant zooplankton groups in aquatic environments and conceptualize the path of carbon and nutrients through these microbial and plankton consumers (the microbial loop)
- Understand the carbon cycle, from the atmosphere to the oceans, consequences of unbalanced carbon cycling, and the role of marine ecosystems in sequestering carbon in sediments (biological carbon pump)
- Determine the causes of ocean acidification and recognize its effects on marine organisms
- Describe several concepts used to describe species interactions and their indirect effects on ecosystems as a whole
- Familiarize themselves with methods to reveal food web interactions and their use in ecosystem modelling
- Understand the uniqueness and diversity of the deep sea
- Explain the differences between freshwater and marine environments and recognize six primary factors that influence freshwater ecosystems
- Describe adaptations that organisms have evolved to live in freshwater environments and how organisms adapt to climate warming
- Describe the effects of eutrophication in freshwater ecosystems using Lake Erie as a case study
- Recognize direct and indirect effects of invasive species on freshwater ecosystems, with an emphasis on zebra mussels
- Understand how fisheries view aquatic ecosystems and recognize the ecosystem effects of harvesting fish and other animals
- Estimate population size of aquatic organisms and recognize other aspects of populations that must be considered to conserve our aquatic resources and ecosystem services

- Describe what a Marine Protected Area (MPA) is, understand how to establish an MPA and what the objectives of an MPA are, determine factors that need to be considered when designing an MPA, recognize the controversy surrounding MPAs, and design their own MPA
- Write a research communication that highlights and summarizes key results in primary literature and communicate the context and importance of the research advances made in primary literature so that it can be understood by a general audience

Delivery Mode

There will be in-person lectures on Mondays from 10:30–11:30 AM and Wednesdays from 9:30–10:30 AM. During the second half of Wednesday's class, there will usually be a 1-hour individual or group participation activity from 10:30–11:30 AM.

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Course Schedule

This schedule may change to accommodate lecture progress or adjust course content over the term.

Week of	Topic	Evaluation
Jan 6/8	Introduction, why water? Water on Earth, water physics and chemistry	Participation #1, #2
Jan 13/15	Nutrients in water, water usage, sustainability Case study – Hudson Bay ecosystem	Participation #3
Jan 20/22	Living in water Reynold's number	Participation #4
Jan 27/29	Primary production, phytoplankton Secondary production, zooplankton, microbial loop Plankton ID	Participation #5
Feb 3/5	Near shore marine ecosystems Biological carbon pump Bloom dynamics	Participation #6
Feb 10/12	Ocean acidification Species interactions, ecosystem effects	Participation #7 Research Communication #1 due Friday February 14th, 5pm
Feb 17/19	Reading week – no classes	
Feb 24/26	Deep sea ecosystems Deep sea biodiversity	Mid-term – in class – Wednesday February 26th (make-up on Monday March 10th, 4:00 pm)
March 3/5	Freshwater ecosystems Eutrophication, case study – Lake Erie	Participation #8
March 10/12	Invasive species Case study – effects of invasive species	Participation #9
March 17/19	Fisheries Conservation ecology	Participation #10 Research Communication #2 due Friday March 21st, 5pm
March 24/26	How many fish in the sea? Guest speaker TBD	Participation #11

Week of	Topic	Evaluation
March 31/April 2	Marine Protected Areas Design an MPA	Participation #12
April 7-30	April exam period	Final Exam scheduled by the registrar

Key Sessional Dates:

Classes begin: January 6, 2025
Spring Reading Week: February 15 – 23, 2025
Classes end: April 4, 2025
Exam period: April 7 – 30, 2025

4. Course Materials

All course material will be posted to OWL: https://westernu.brightspace.com/
There is no textbook. Readings and other resources will be posted on OWL.

Students are responsible for checking the course OWL site (https://westernu.brightspace.com/) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the OWL Brightspace Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

Course Component	Weight	Evaluation	Due date
Participation Activities	10%	Participation in class activities	In class – almost every week, see course schedule
Research Communication Assignment #1	10%	Writing to explain and communicate scientific research	Online – Friday February 14th, 5pm
Midterm	25%	Short and long answer	In class – Wednesday March 5th, 9:30am (make-up on Wednesday March 12th, 4:00 pm)
Research Communication Assignment #2	15%	Writing to explain and communicate scientific research	Online – Friday March 21st, 5pm
Final Exam	40%	Short and long answer Including interpretation and communication questions about a pre-assigned research article	Scheduled by the registrar

Participation
Students will be assessed based on participation and engagement in class activities (in groups or individually), and submission of written answers to short, in-class assignments. There will be approximately 12 participation activities that will be graded on a scale of 0 to 3 (0 = not submitted, 1 = incomplete, 2 = complete but poor contribution or answers, 3 = complete and sufficient contribution or answers). You can miss submitting up to 3 participation activities without penalty and without academic consideration. Beyond that, please see the Student Absences section below if you have a valid reason to be excused from a participation submission without penalty. If any participation activities are missed, you are still responsible for the material covered in the activity.

Research Communications
Students are to write 2 communications (~ 1500 words each) explaining a research article and defining concepts in aquatic ecology. These writing assignments will assess the communication of ideas, evaluation of evidence, and understanding of concepts in aquatic ecology. The communications will be submitted to Turnitin (see Scholastic Offences statement in Academic Policies below). Details for each Research Communication will be provided in class and via OWL. Research communication #2 must be completed to pass the course.

Midterm and Final Exam
The Midterm and Final exam will consist of short- and long-answer questions. The Final Exam will also include communicating the results of a research article assigned at the end of term.

Late Course Components
Assignments, presentations, and reports must be handed in on the appropriate due date unless a valid excuse is provided through the Student Absence Portal, and an alternate due date will be arranged with your instructor. If you are a Science student, the Academic Advising Office of the Faculty of Science is open for in-person and virtual appointments. Their website is
https://www.uwo.ca/sci/advising/advising_services/index.html

General information about missed coursework
Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:
https://registrar.uwo.ca/academics/academic_considerations/
All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests normally must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting**

documentation in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)
- Research Communication #2 (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Evaluation Scheme for Missed Assessments

Late assessments without academic consideration will be subject to a late penalty of 10% per day.

If you miss the midterm (Wednesday March 5th, 9:30 am), please visit the Student Absence Portal as soon as you are able to do so. If you are granted academic consideration, then you are eligible to write the make-up midterm (scheduled for Wednesday March 12th, 4:00 pm). If you also miss the make-up midterm, then you must visit the Student Absence Portal again. If you are again granted academic consideration, the weight of the midterm will be shifted to the final exam (i.e. the final exam will be worth 65%).

If you miss the Final Exam, please contact the Student Absence Portal as soon as you are able to do so. When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period. If you miss both the regular and SPC final exams with excused absences, you will be required to write the final exam the next time this course is offered, likely in April 2026.

Essential Learning Requirements
Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade:

- Completion of Research Communication #2
- Completion of Final Exam

Students not meeting these conditions will receive a maximum grade of 45. The table below outlines the University-wide grade descriptors.

A+	90–100	One could scarcely expect better from a student at this level
A	80–89	Superior work which is clearly above average
B	70–79	Good work, meeting all requirements, and eminently satisfactory
C	60–69	Competent work, meeting requirements
D	50–59	Fair work, minimally acceptable
F	Below 50	Fail

Coursework with Assessment Flexibility
By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

Flexible Completion
Participation Activities. This course has approximately 12 in-class participation activities, and the 9 in-class participation activities with the highest marks are counted towards your final grade. Should extenuating circumstances arise, students do not need to request Academic Consideration for the first 3 missed participation activities. Academic Consideration requests will be denied for the first 3 missed participation activities. Academic Consideration requests will be denied when students miss more than 3 participation activities, and these additional ($4^{th,}$ 5^{th}, …) missed participation activities will be given a zero mark.

Deadline with a No-Late-Penalty Period
Research Communication Assignments. Students are expected to submit each of the Research Communication assignments by the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 48 hours past the deadline without a late penalty. Should students submit their assessment beyond 48 hours past the deadline, a late penalty of 10% per day will be applied. Academic Consideration requests may be granted only for extenuating circumstances that started and were requested before the deadline and lasted longer than the No-Late-Penalty Period (48 hours).

6. Additional Statements

Religious Accommodation
When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays:

https://www.edi.uwo.ca.

Accommodation Policies
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf.

Academic Policies
The website for Registrar Services is https://www.registrar.uwo.ca/.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Electronic devices will not be permitted on tests and exams.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Remote Proctoring, in the event of a health lock-down:
Tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

https://remoteproctoring.uwo.ca.

Support Services
Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic-related matters: https://www.uwo.ca/sci/counselling/.

Students who are in emotional/mental distress should refer to Mental Health@Western (https://uwo.ca/health/) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at Learning Development and Success (https://learning.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.