

Biology 3425G Course Outline Global Change Biology Winter Term 2025

1. Course Information

Class: Fri, 8:30 AM-12:30 PM

Room:

Delivery: The class for Biology 3425G in the Winter Term 2024 will consist of a 50-minute in-person lecture followed by questions on the lecture material. We will reconvene after a brief break for ~50 minutes of small group discussions, followed by another short break, and then a ~50-minute whole class discussion. Discussion topics and required readings will be presented with each week's lecture notes.

List of Prerequisites: Biology 2290F/G; Biology 2483A/B; Biology 2601A/B.

Unless you have either the requisites for this course or written special permission from your Dean or Dean's Designate (Department or 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 if you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Instructor: Dr. Joshua Frank-Webb	jfrank22@uwo.ca			
TA: Adriana del Pilar Caicedo Arguelles	acaiced@uwo.ca			

Office hours will take place via Zoom. Please email Dr. Frank-Webb or the TA in advance to arrange a specific time for the meeting, and you will receive a Zoom link. Students can also use the Forum on Brightspace to pose questions and discuss topics amongst themselves. When contacting their instructors, students must use their Western (@uwo.ca) email addresses. Emails will be monitored daily; students will receive a response in 24 – 48 hours.

3. Course Syllabus, Schedule

This course will investigate concepts and issues associated with organisms' and ecosystems' responses to global-scale environmental changes. Topics covered will include changes in atmospheric CO₂ concentration, global warming, changes to the nitrogen cycle, and invasive species biology.

Learning Outcomes:

From lecture materials and readings, students will be able to describe:

- the impact of atmospheric CO₂ on the global carbon cycle
- the physiological effects of rising atmospheric CO₂ on biological systems
- how warming affects organisms and ecosystem processes (like heterotrophic respiration)
- what land use change is and why it is occurring
- how land use change impacts organisms
- the nitrogen cycle and how eutrophication affects organisms and ecosystems
- what an invasive species is and how they impact communities
- how biodiversity loss impacts the functioning of communities
- how global change factors interact with each other
- how global change intersects society, activism and social justice
- how to apply solutions to the issues that arise from global change
- how organisms adapt and acclimate to environmental change
- understand how climate models work

Week	Date	Topic
1	Jan 10	Introduction to Global Change Science: Past and Future
2	Jan 17	Elevated CO ₂ – the carbon cycle and effects on organisms
3	Jan 24	Elevated CO ₂ – effects on communities and ecosystems
4	Jan 31	Global warming – causes and effects on organisms
5	Feb 7	Global warming – effects on higher ecological scales
6	Feb 14	Land use change – patterns and drivers
7	Feb 21	Reading Week
8	Feb 28	Land use change – effects on organisms
9	March 7	The Nitrogen Cycle and Eutrophication
10	March 14	Invasive Species and Community Impacts
11	March 21	Biodiversity Loss and Ecosystem Functioning
12	March 28	Interactions Among Global Change Factors
13	April 4	Solutions to Global Change Challenges, Society, and Social Justice

Key Sessional Dates are listed below:

Classes begin: January 6, 2025

Spring Reading Week: February 17 – 21, 2025

Classes end: April 4, 2025

Exam period: April 7 – 30, 2025

Contingency plan

Although the course intends to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

4. Course Materials

Readings: Readings will be assigned from the primary literature and will be posted to the OWL course site. You are expected to have read the assigned paper(s) and considered the main topics for a given week prior to coming to class, in order to be able to follow the material and contribute to discussions. Discussion participation is a significant component of the grade, and attendance is mandatory.

Required equipment: A laptop or computer for assignments and a stable internet connection are required for access to OWL.

Website: An OWL website has been established for this course. All course documents and information (syllabus, lecture files, instructional documents, required readings, grades, etc.) will be posted to OWL. Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for updates and announcements.

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, which can be contacted by phone at 519-661-3800 or ext. 83800.

Your marks will be regularly updated under 'Gradebook' in OWL. You may query any apparent inconsistencies between what you thought you received and what is on OWL. When assessing these marks, keep in mind you will not have marks for things that have not yet been marked.

5. Methods of Evaluation

Course assessment: The overall course grade will be calculated as listed below (*with due dates for major assignments):

20% Class Participation (see below for details)

15% Weekly Reading Reflections (see below for details)

15% Weekly Quizzes (see below for details)

20% Paper Critique (see below for details; *due Friday, February 14)

30% Term paper (see below for details; *due Friday, April 4)

Please read the sections on university and course policies below.

Your final grade for the course will be calculated as the sum of your marks for each of the components. This mark will then be rounded to the nearest integer. No marks will be awarded for arbitrary reasons, and there will be no after-the-fact changes (e.g., of 69 to 70%).

After an assessment is returned, students should wait 24 hours to digest feedback before emailing Dr. Frank-Webb or the TA.

Class Participation: 20% of the course grade will reflect attendance and meaningful participation in discussions. Your participation in the discussion section is essential for your own development as a scientist and leader, and all students are expected to contribute on a weekly basis. During discussion sections, electronic devices are only permitted if they are being used to look up information that is pertinent to the discussion, or to take notes. The Class Participation grade will be broken down into four parts:

1. Attendance (5%) – **attendance is mandatory**. For more information, see course policies on attendance and missed classes below.
2. Group discussion participation (5%): all groups will be evaluated weekly on the level of their discussion, the inclusiveness of all members of the group, and how thoroughly they discuss the question/discussion topic.
3. Group discussion spokesperson report back (5%): Each student will report back on their group's discussion session once during the term (students will organize themselves to take turns to do this each week). The grade will be based on their report's clarity, completeness, and conciseness. The spokesperson will work with another student in the group who will be the official note taker for that week to summarize the group's discussion. No submission is needed for this assignment. Report backs will be given a mark of 0 (no report), 1 (report given, poorly constructed), 2 (adequate, lacking clarity or detail), 3 (good), 4 (excellent), or 5 (superior) depending on the level of detail and clarity of the notes. Grades will be uploaded to OWL for all students at the end of the semester.
4. Group discussion note taker report (5%): Each student will be the official "note taker" for their group's discussion session once during the term (students will organize themselves to take turns to do this each week). The note taker will work with another student in the group who will be the official "spokesperson" for the group for that week to come up with a summary of the group's discussion to present to the rest of the class. The note taker will upload their notes in a word or pdf file for this assignment by the end of each class. A 10% per day late policy will be applied. Note taker reports will be given a mark of 0 (no report), 1 (report given, poorly constructed), 2 (adequate, lacking clarity or detail), 3 (good), 4 (excellent), or 5 (superior), depending on the level of detail and clarity of the notes. Grades will be uploaded to OWL for all students at the end of the semester.

Weekly Reading Reflections:

Students will critically engage with the assigned weekly readings (2–4 research papers, posted as PDFs on OWL Brightspace) by submitting concise reflections **before class**. The reflections are worth 15% of your final course grade. These reflections are designed to foster critical thinking, synthesis of ideas, and connections between academic content and the broader world.

Instructions for Reflection:

Each submission must include the following **four components**:

1. **Key Findings (1 point):**
 - Summarize the key findings of one of the assigned papers in up to **3 concise bullet points**.
 - Highlight the central conclusions or insights relevant to the paper's objectives.

2. **Caveat or Limitation (1 point):**

- Identify and describe **one limitation or caveat** of the study.
- Compare it to other assigned papers for the week, if applicable, to highlight differences or conflicting results.

3. **Proposed Advancement (1 point):**

- Propose a **hypothesis, experiment, research objective, or question** that would further develop the study's findings or address a limitation.
- Be specific and creative while grounding your proposal in the context of the selected paper.

4. **Connection to Lived Experience or Real-World Context (1 point):**

- Reflect on how the paper's findings relate to your own experiences, current events, or other sources such as:
 - News articles
 - Social media discussions
 - Prior coursework or lectures
 - Community or societal challenges
- Example prompts for this reflection:
 - "How does this research align with what you've seen in the news or on social media?"
 - "Can you connect these findings to issues you've encountered in your own community or experiences?"
 - "How does this research build on knowledge from previous classes or lectures?"

Evaluation Criteria:

Submissions will be graded on a 4-point scale as follows:

- 0 points: No submission or completely irrelevant submission.
- 1–2 points: Incomplete submission with minimal effort or partial responses to fewer than four components.
- 3 points: All components addressed with basic effort but limited depth or connections.
- 4 points: Outstanding submission with clear, concise, and thoughtful responses to all components, demonstrating critical thinking and meaningful engagement with the material.

Submission Policies:

The cumulative score for Weekly Reading Reflections will account for **20%** of the final course grade. The lowest weekly reflection score will be dropped from the final grade calculation. All reflections are expected to be submitted before class (Friday at 8:30 am) as an electronic copy on OWL. Should extenuating circumstances arise, students **do not** need to request Academic Consideration and they are permitted to submit their assignment up to 72 hours past the deadline without a late penalty. Should students submit their assessment beyond 72 hours past the deadline, a late penalty of 5% per day will be applied. Academic Consideration requests may be granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (72 hours).

Quizzes: Each week, there will be an online quiz covering the material from the previous week's lecture. Each quiz will consist of one long answer question. The quizzes will be run through the OWL Brightspace's Quizzes tab and will be available for ~24 hours before class, though each quiz will be timed once you begin. The quiz should only take about 10 minutes to complete; however, students will have 15 minutes to complete each quiz. The quizzes will cumulatively account for 15% of the course grade. The lowest quiz grade will be dropped. A 10% per day late policy will be applied.

Paper Critique: For 20% of your course grade. This assignment requires students to critically analyze a research paper addressing an issue related to global change. The critique should assess the paper's objectives, methods, results, and broader significance while engaging with the study's strengths and limitations. Students will demonstrate their ability to evaluate scientific literature at an advanced level and connect it to broader global change themes.

Paper Selection:

Choose a peer-reviewed research paper focusing on an aspect of global change (e.g., climate change, biodiversity loss, land-use change, invasive species, or nutrient cycles). The paper must be published within the last 5 years, **no earlier than 2019**.

Your critique should address the following key components:

1. Introduction and Context:

Briefly summarize the paper's objectives, research questions, and hypotheses. Situate the paper within the broader context of global change. Why is this study important?

2. Methods and Experimental Design:

Evaluate the methods used in the study. Were they appropriate for the research questions? Discuss any biases, assumptions, or limitations inherent in the experimental design.

3. Results and Interpretation:

Summarize the main findings of the study. Critique the data interpretation. Are the conclusions supported by the results? Were any key findings overlooked or overemphasized?

4. Broader Implications:

Analyze the study's relevance to global change science. Discuss how the findings contribute to understanding global change processes, policy development, or practical applications.

5. Strengths and Weaknesses:

Identify strengths in the study's design, execution, and impact. Highlight limitations or areas for improvement. Include potential confounding factors or unexplored dimensions.

6. Future Directions:

Suggest experiments, analyses, or research questions that could build on this study. How could this research inform or intersect with other global change issues?

7. Correctly or poorly/incorrectly cited literature within the paper (and why):

The goal here is to learn how to identify correctly: a) how, and for what, peer-reviewed journal articles cite past studies; and b) how past studies can be poorly or incorrectly cited.

Formatting and Submission:

Length: 4-5 pages (excluding references and figures).

Formatting: 12-point Times New Roman font, double-spaced, 1-inch margins.

Citations: Use APA, MLA, or a relevant scientific format. Include a complete reference list.

Submission: Upload to OWL Brightspace by Feb 14.

Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 72 hours past the deadline without a late penalty. Should students submit their assessment beyond 72 hours past the deadline, a late penalty of 5% per day will be applied. Academic Consideration requests may be granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (72 hours). **The Critique Paper must be completed to pass the course.**

Term Paper: For 30% of the course grade, you are to write a term paper on a global change biology topic that will be assigned in class. The paper should be up to 10 pages long, not including references or figures, with double-spaced, 12-point font text and 1-inch margins. You should have at least 20 references, and references should focus on the primary and secondary literature, with at least 80% of your references from research and review papers. The paper must be submitted online through the OWL Brightspace site via turnitin.com by 11:55 pm on Friday, April 5. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 72 hours past the deadline without a late penalty. Should students submit their assessment beyond 72 hours past the deadline, a late penalty of 5% per day will be applied. Academic Consideration requests may be granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (72 hours). **The Critique Paper must be completed to pass the course. The Term Paper must be completed to pass the course.**

The list 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

NOTE: To pass this course, you must get at least 50% on both the written components (Paper Critique and Term Paper) and the in-class participation. If you need accommodations for the exams, they will be made available.

Students must get a passing grade (D or above/50+) on the Critiques Paper and Term Paper to satisfy the Senate requirement that students must demonstrate “some minimal competence in essay writing” in

order to pass this essay course. (Please see the following sections for late work and student absence policies for these two-course components).

6. Student Absences and Missed/Late Evaluations

- Class attendance is mandatory, and class participation is a significant component of your final grade (see Section 5). Attendance will be taken each week, and grades for group discussion (and attendance) will be given each week (although the final class participation grade will only be submitted to the Gradebook at the end of the semester).
- If students miss class or any assessment due to illness or another serious circumstance for three weeks or more, they will be required to provide proof of the reason for their absence in order to make up the grade. If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below:

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](#).

Students missing course work for medical, compassionate, or extenuating circumstances can request academic consideration by completing a request at the central academic consideration portal (website above). Note that supporting documentation is always required for academic consideration requests for final examinations.

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.

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.

Late assignments

- Late assessments for the quizzes and weekly reading reflections without illness self-reports (or another university recognised absence) will be subject to a late penalty of 5% per day.
- Late assessments for the quizzes and weekly reading reflections with illness self-reports (or with a reported university recognised absence) (and documentation submitted through the Student Absence Portal, if three or more weeks of class have been missed) should be submitted within 1 week of the original deadline. Additional time can be given on an ad hoc basis as needed.

Missing class

- There will be no late penalties available for missing class. Missed evaluations for class participation without illness self-reports (or another university recognised absence) will result in a grade of zero for that week.
- Missing attendance or missed evaluations for class participation with illness self-reports (or with a reported university recognised absence) (and documentation submitted through the Student Absence Portal, if three or more weeks of class have been missed) will be re-weighted, i.e., the week of the excused absence will be removed from the students overall score for that category.

NOTE: Please email both Dr. Frank-Webb and the TA before the start of the class and/or before the due date for the assignment if you anticipate missing it. Documentation (or self-report, allowed once per course) should be submitted through the Student Absence Portal.

For further information, please consult the University's medical illness policy at: https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf.

The Student Medical Certificate is available at: <https://registrar.uwo.ca/academics/pdfs/student-medical-certificate.pdf>.

Students will be given an extension to complete the work after their case has been assessed and approved by Academic Advising Office of your Faculty of Registration.

Note: missed work can only be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential illness (e.g., COVID-19 symptoms) is not sufficient on its own.

7. Accommodation and Accessibility

Religious Accommodation

When a course requirement 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 at least two weeks prior to the holiday to the course instructor and/or the Academic Advising office of their Faculty of Registration. 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.

8. Academic Policies

The website for Registrarial Services is <http://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 during quizzes and assignments: All quizzes and assignments are “open book” and students are encouraged to use materials from the course in addition to further literature search (for the term paper) to complete those quizzes and assignments.

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

Plagiarism: Plagiarism is an academic offense and will not be tolerated. Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author they must acknowledge their debt both by using quotation marks where appropriate, and by proper and accurate referencing in the form of scientific citations. All required papers will 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>).

Turnitin: 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>).

Professionalism & Privacy: Western students are expected to follow the Student Code of Conduct. Additionally, the following expectations and professional conduct apply to this course:

- Students are expected to follow online etiquette expectations provided on OWL if we need to move the course to a virtual format.
- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared.

- Recordings are not permitted (audio or video) without explicit permission.
- Permitted recordings are not to be distributed.
- All recorded sessions will remain within the course site or unlisted if streamed.

9. 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/advising/>.

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/>.

10. Land acknowledgment

We acknowledge that Western University is located on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Attawandaron peoples, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum. This land continues to be home to diverse Indigenous peoples (e.g. First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital contributors of our society.