

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

Global Biogeochemical Cycles GEOG 4017 A [0.5 credit]
Tuesday and Thursday 11:35- 12:55

Winter 2025

Instructor: Elyn Humphreys,

Office location & hours: A301a Loeb Building, stop by or please email me to make an appointment.

Email: elyn.humphreys@carleton.ca

Brightspace course [link](#)

1. Course description:

Processes that control the fluxes and reservoirs of biologically active chemical constituents on land, in the atmosphere, and in the oceans. Interactions between biogeochemical cycles and the Earth's climate; impact of land use and fossil fuel emissions on biogeochemical cycles and global change.

2. Preclusions: none

3. Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe global carbon and nitrogen cycles.
2. Critically assess human impacts on these global biogeochemical cycles.
3. Analyze and evaluate the results of scientific studies.
4. Critically assess science-based news on biogeochemical cycle topics or studies.

4. Texts:

Assigned readings will be available via the library (online) and Brightspace

Lecture slides will be made available through Brightspace*

*Student or professor materials created for this course (including presentations, posted notes, and assignments) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

5. Course Schedule:

Each week will generally consist of an 80 min lecture and an 80 min student-led discussion reviewing journal articles and a biogeochemistry topic “in the news”.

Tentative schedule:

| | |
|---------------|---|
| Tues, Jan 7 | Lecture 1. Introduction/ Global Biogeochemistry |
| Thurs, Jan 9 | Lecture 2. The Global Carbon Cycle - Atmosphere |
| Tues, Jan 14 | Discussion Paper and topic in the news (Instructor presentation/student participation) |
| Thurs, Jan 16 | Lecture 3. Carbon Cycle – Terrestrial Ecosystems |
| Tues, Jan 21 | Discussion Papers |
| Thurs, Jan 23 | Lecture 4. Carbon Cycle – Northern and Tropical Wetlands |
| Tues, Jan 28 | Discussion Papers |
| Thurs, Jan 30 | Lecture 5. Carbon Cycle – Permafrost ecosystems |
| Tues, Feb 4 | No Class – Independent work period for Assignment 1 |

| | |
|--------------------|---|
| Thurs, Feb 6 | No Class – Independent work period for Assignment 1 |
| Tues, Feb 11 | Lecture 6. Carbon Cycle – Agricultural systems |
| Thurs, Feb 13 | Lecture 7. Carbon Cycle – Inland waters |
| <i>Feb 17 – 21</i> | <i>Reading Break</i> |
| Tues, Feb 25 | Discussion papers |
| Thurs, Feb 27 | Lecture 8. Carbon Cycle – Oceans |
| Tues, Mar 4 | Discussion Papers |
| Thurs, Mar 6 | Lecture 9. Introduction to the Global Nitrogen Cycle |
| Tues, Mar 11 | Discussion Papers |
| Thurs, Mar 13 | Lecture 10. Nitrogen Cycling– part 1 |
| Tues, Mar 18 | Discussion Papers |
| Thurs, Mar 20 | Lecture 11. Nitrogen Cycling– part 2 |
| Tues, Mar 25 | Discussion Papers |
| Thurs, Mar 27 | Lecture 12. Nitrogen Cycling– part 3 |
| Tues, Apr 1 | Discussion Papers (if needed) |
| Thurs, Apr 3 | No Class – Independent work period for final assignment |
| Tues, Apr 8 | No Class – Independent work period for final assignment |

6. Course Evaluation:

- 40% Presentations
- 15% Participation in class discussions
- 20% Assignment 1 – due Feb 11
- 25% Final assignment – due April 8

Paper presentations (25%): Each student will be responsible for leading a ~16-20 minute discussion of the papers they are assigned. This entails an introduction to the paper and its context, the scientific questions asked, the important findings and conclusions and the points of debate (e.g., contradictions with other results etc.). On the Thursday before the presentation in class, 2-3 discussion questions on the papers must be submitted via Brightspace. These questions will be disseminated to the rest of the class to focus their reading of the papers.

‘Biogeochemistry in the news’ (15%): Each student will have ~8-10 minutes to present a biogeochemistry topic in the mainstream news (must be from the past 5 years) relevant to the current lecture set. The presentation will include a summary of the news article and a synthesis of the primary literature of the subject area with the goal of interpreting the news article critically.

Participation: All students are expected to read all the papers/articles reviewed each week and contribute to the discussion and participate during in-class activities.

Assignments: Students may discuss their work but all answers must be written by the individual acting alone. Do not edit or otherwise proofread another student’s submission.

Assignments will be submitted online. For each day late, 10% will be deducted per day. Extensions may be granted for legitimate compassionate reasons. Please arrange for an extension BEFORE the deadline. Assignments will not be accepted for grading after graded assignments are returned.

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

7. Statement on Plagiarism:

The University Academic Integrity Policy defines plagiarism as “*presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.*” This includes reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, artworks, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations.

Examples of plagiarism include, but are not limited to:

- any submission prepared in whole or in part, by someone else, including the unauthorized use of generative AI tools (e.g., ChatGPT)
- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment
- using another’s data or research findings without appropriate acknowledgement
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one’s own
- failing to acknowledge sources with proper citations when using another’s work and/or failing to use quotations marks.

Plagiarism is a serious offence that cannot be resolved directly by the course’s instructor.

The Associate Dean of the Faculty follows a rigorous [process for academic integrity allegations](#), including reviewing documents and interviewing the student, when an instructor suspects a violation has been committed. Penalties for violations may include a final grade of “F” for the course.

8. Statement on Student Mental Health

As a student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. For more information, please consult <https://wellness.carleton.ca/>.

9. Requests for Academic Accommodations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website (students.carleton.ca/course-outline).