



Geography 304 **Carbon in the Biosphere**

Spring 2019

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Calendar description: This course investigates stocks and fluxes of carbon in forests, wetlands and lakes through field investigations in the forest, wetland and lakes in southern Ontario. This field-based course will focus on measurement methods, data collection and interpretation. Topics include forest biomass inventory, soil organic matter, soil carbon dioxide and methane exchange and dissolved organic carbon.

Learning Outcomes:

1. Students will become familiar with many field and laboratory techniques for determining stocks and fluxes of carbon in the biosphere.
2. Students will understand the challenges associated with data collection, analysis and interpretation and be able to evaluate the accuracy and precision of a range of field techniques.
3. Students will apply what they have learned to develop their own research question related to biosphere carbon exchange, design a study, present a proposal, provide feedback on proposals of their peers, collect appropriate data and prepare a consulting type report of the results.

Evaluation

Pre-field trip reading seminar	15%
Field notebook	10%
Participation	15%
Labs (4 x 7.5% each)	30%
Proposal presentation	5%
Final report	25%

Course Schedule

Date	Activity	Deliverable	Location
Early to mid May (TBD)	Reading assignments and course overview		TREE Lab
Friday, June 21	Safety and lab orientation Reading seminars Study site tour	Presentation of assigned reading to the class	TREE Lab UWaterloo Environmental Reserve
Saturday, June 22	Forest biomass inventory	Lab report 1	Environmental Reserve
Sunday, June 23	Soil organic matter and understory CO ₂ exchange Proposal pitch	Lab report 2	Environmental Reserve TREE Lab
Monday, June 24	Wetland CH ₄ flux and dissolved organic carbon	Lab report 3	Fletcher Creek Ecological Preserve
Tuesday, June 25	Lake carbon exchange	Lab report 4	Environmental Reserve
Wednesday, June 26	Proposal presentations and preliminary data collection	Proposal presentation	Ecology Lab Environmental Reserve
Thursday, June 27	Data collection		Environmental Reserve
Friday, June 28	Data collection	Field notebook	Environmental Reserve
One month later	Complete project report	Project report	

Course Readings:

There is no textbook for this course but I may put materials on reserve in the library or course website as needed. Readings will be assigned in mid-May prior to departure and must be completed before the field portion of the course.

Attendance and In-class Discussions: The ability to communicate via discussion is an important skill to develop for academia, the private sector and other public workplaces. Students are expected to listen carefully, be objective, and contribute to in-class discussions. Such discussions may occur in the classroom or out in the field. Your involvement in these discussions will be reflected in your participation grade. Regular attendance of this course is essential as much of the learning in this course is hands-on. A portion of your participation grade will reflect your regular attendance and participation in class (particularly group discussions and proposal reviews).

Field Journals: One of the most important tools a Geographer has is the field journal. All field journals, no matter what their form, serve the same purpose: to record, describe, analyze and remember some form of data. Your journal for this class may include entries from lecture notes and readings but will largely consist of field notes. Your field journal must accompany you to each class and is *ALWAYS WITH YOU IN THE FIELD*.

PLEASE NOTE

◆ **Intellectual Property:** Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

◆ **Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. The University's guiding principles on academic integrity can be found here: <http://uwaterloo.ca/academicintegrity>. ENV students are strongly encouraged to review the material provided by the university's Academic Integrity office specifically for students: <http://uwaterloo.ca/academicintegrity/Students/index.html>

Students are also expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for their actions. Students who are unsure whether an action constitutes an offense, or who need help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. Students may also complete the following tutorial: <https://uwaterloo.ca/library/get-assignment-and-research-help/academic-integrity/academic-integrity-tutorial>

When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline: <https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71>. Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance:

<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>

◆ **Note for students with disabilities:** AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for

students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

◆ **Mental Health:** The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. Please note that help is available. Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services <http://www.uwaterloo.ca/counselling-services> **is an inclusive, non-judgmental, and confidential space** for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

◆ **Religious Observances:** Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

◆ **Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. See Policy 70 - Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please contact your Undergraduate Advisor for details.

◆ **Appeals:** A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) www.adm.uwaterloo.ca/infosec/Policies/policy72.htm

◆ **Unclaimed assignments:** Unclaimed assignments will be retained until one month after term grades become official in Quest. After that time, they will be destroyed in compliance with UW's confidential shredding procedures.

◆ **Communications with Instructor and Teaching Assistants:** All communication with students must be through either the student's University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

◆ **Turnitin:** Text matching software (Turnitin®) will be used to screen assignments in this course. This is being done to verify that use of all materials and sources in assignments is documented. To better understand the meaning of 'similarity' in Turnitin, see https://guides.turnitin.com/01_Manuals_and_Guides/Student/Classic_Student_User_Guide/17_Similarity_Check#Viewing_an_Originality_Report. Students will be given an option if they do not want to have their assignment screened by Turnitin®. In the first week of the term, details will be provided about arrangements and alternatives for the use of Turnitin® in this course.