

ENV 316 - Laboratory and Field Methods in Environmental Science

This course focuses on methods of sampling and analyzing physical properties, and chemical and biological constituents of air, land, and water. It will integrate topics from chemistry, physics, carbon cycle and climate change. Techniques in field sampling, laboratory analyses, and analyses of large environmental data sets will be covered. Students will also learn about sampling design strategies to deal with spatial and temporal representativeness.

Time and Place: The course meets in person, from 1-5 pm every Friday (but check the weekly schedule as rooms may differ depending on the activity). Sessions will usually consist of an approx. 1-hour lecture and a 1-hour tutorial, followed by 2 hours of independent work with instructors present.

Instructors: Olalekan Balogun, o.balogun@utoronto.ca (Physical & Environmental Geography)
Hui Peng, hui.peng@utoronto.ca (Environmental Chemistry)
TAs: Claudia Lacroix, claudia.lacroix@mail.utoronto.ca
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Office hours: Can be scheduled by appointment by emailing the appropriate instructor or TA or as otherwise stated in the first class on September 8th.

Website: We will communicate with you using the course Quercus site. You are responsible for consulting it regularly for updates and to access readings.

Textbook: There is no textbook for the course. We will provide resources and links to readings on the course Quercus site.

Evaluations:

Physical & Environmental Geography	50%
Two R assignments: (3%, 7%)	10 %
R Quiz	5%
Two reports (10 % each)	20 %
Final physical geography project	15 %
Environmental Chemistry	50%
Two assignments: (5%, 5%)	10 %
Project presentation	15 %
Final chemistry project report	25 %

Final Physical Geography Project: You will apply skills and concepts developed in the course to an environmental issue related to carbon cycling and climate change in terrestrial ecosystems or urban environments while working with a large dataset. The written component will be approximately 1500

words, excluding relevant tables, figures, and references. Further details will be given in class. The final project is due on October 27th.

Final Environmental Chemistry Project: You will apply skills and concepts developed in chemistry labs, to interpret the results and relate the data to background knowledge of corresponding pollutants. You will be expected to coordinate with group members to discuss the results, interpret the data and deliver the presentation. The written component will be 2500 words maximum, in addition to relevant tables, figures, and references. The final project report is due on December 11th.

Date	Week	Lecture Topics & Lab Activities	Location	Due date for
Sept. 8	1	General Introduction to Course Basic statistics and sampling R Tutorial 1	SS561	
Sept. 15	2	Field Trip to Humber River	Humber River	R Homework 1
Sept. 22	3	The Global Carbon Cycle R Tutorial 2	SS561	R Quiz
Sept. 29	4	Peatland ecosystem carbon Carbon cycle data analysis 1	SS561	R Homework 2
Oct. 6	5	Boreal forests carbon Carbon cycle data analysis 2	SS561	Physical Geography Report 1
Oct. 13	6	Urban air pollution Final Physical Geography Project lab	SS561	Physical Geography Report 2
Oct. 20	7	Environmental chemistry and toxicology in the big data era	SS561	
Oct. 27	8	Chromatography and computation Chemistry lab (lab tour and OPFR analysis)	LM117	Physical Geography Final Project
Nov. 3	9	Chemistry lab (plastic product analysis)	LM117	
Nov. 10		Reading Week		
Nov. 17	10	Mass spectrometry and computation I (non- targeted analysis)	SS561	
Nov. 24	11	Mass spectrometry and computation II (non- targeted analysis)	SS561	Chemistry assignment 1
Dec. 1	12	Final presentation	SS561	Due on Dec 11 Chemistry assignment 2 & Final report

Submission and formatting guidelines: Unless otherwise specified, all assignments should be submitted via Quercus. Written assignments are required to be submitted in PDF format, using a standard font with a size of 11–12pt and normal document margins. The cover page must contain your full name, student ID number, assignment title and name of the instructor and TA. In case you collaborated with fellow students on an assignment or project, please include their names on the cover page as well. Additional guidelines for other assessments will be provided in class.

Late work policy: The due dates of assignments and essays are outlined below. Work handed in late will be penalized at 10% per day, including the weekend, starting at 1:10 pm (the start of class, except where noted) on the due date.

Absences: Students who are unable to attend Friday from 1-5 pm, for legitimate reasons or otherwise, are responsible for making up the missed material. Students who miss a deadline should contact the instructors ahead of missing the deadline or as soon as possible and no later than one week after returning to class.

Website and Online Interfaces: All material for both class and lab will be provided through Quercus. You are responsible for checking this site regularly. Specific details for each meeting will be provided on Quercus.

Use of Generative AI for this Course: Generative Artificial Intelligence (AI), and specifically foundational models that can create writing, computer code, and /or images using minimal human prompting, are proliferating, and becoming ubiquitous. This includes not only GPT-4 (and its siblings ChatGPT and Bing), but many writing assistants that are built on this or similar AI technologies. In this course, students may use generative artificial intelligence tools, including ChatGPT, as learning aids to produce or debug R codes. However, the final submitted assignment must be original work produced by the individual student alone.

Technological Requirements: This course requires the use of computers. It is imperative that students are able to download the free statistical program R (<https://www.r-project.org/>); students will not be able to complete course assignments without access to R. It is also advisable that students use R studio (<https://rstudio.com/products/rstudio/download/>), as this program facilitates the use of R.

You are responsible for ensuring that you maintain regular backup copies of your files, use antivirus software (if using your own computer), and schedule enough time when completing an assignment to allow for delays due to technical difficulties. Computer viruses, crashed hard drives, broken printers, lost or corrupted files, incompatible file formats and similar mishaps are common issues when using technology and are not acceptable grounds for a deadline extension.

Specific guidance from the U of T Vice-Provost, Students regarding student technology requirements is available here: <https://www.vicereprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/>

Advice for students more broadly regarding online learning is available here: <https://onlinelearning.utoronto.ca/getting-ready-for-online/>

Academic Integrity: While discussions among classmates are encouraged, any material that you submit or present MUST represent your own independent work and comprehension.

Information about academic integrity can be found here: <http://www.artsci.utoronto.ca/osai/>

A copy of U of T's Code of Behaviour on Academic Matters can be found here:

(<https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019>).

Helpful advice on how not to plagiarize can be found here: <http://advice.writing.utoronto.ca/using-sources/how-not-to-plagiarize/>. Please read this document.

Potential offences include, but are not limited to:

In papers and assignments:

1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

1. Using or possessing unauthorized aids.
2. Looking at someone else's answers during an exam or test.
3. Misrepresenting your identity.

In academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University.

Copyright: If a student wishes to copy or reproduce lecture presentations, course notes or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Otherwise, all such reproduction is an infringement of copyright and is absolutely prohibited. More information regarding this is available here: <https://teaching.utoronto.ca/resources/recording-of-lectures-and-class-sessions/>.

Accommodations: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability or health consideration that may require accommodations, please feel free to approach one of the instructors and/or Accessibility Services at (416) 978 8060; <http://accessibility.utoronto.ca>

Additional Services and Support: The following are some important links to help you with academic and/or technical service and support:

- General student services and resources at [Student Life](#)
- Full library service through [University of Toronto Libraries](#)
- Resources on conducting online research through [University Libraries Research](#)
- Resources on academic support from the [Academic Success Centre](#)
- Learner support at the [Writing Centre](#)
- Information for [Technical Support/Quercus Support](#)