

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, water, and earth. It will integrate topics from chemistry, physics, ecology, and earth sciences. Techniques in field sampling, laboratory analyses and analyses of large environmental data sets will be covered. Basic concepts related to quality control will be emphasized: sample collection and storage methods, calibration of field and lab instruments, and errors (accuracy, precision, detection limits). Students will also learn about sampling design strategies to deal with spatial and temporal representativeness.

Time and Place: The course meets from 1-5 pm every Friday. We will frequently meet in a CQuest facility (RW 107) or the Analest facility (LM 6) in the basement of Lash Miller, but consult the weekly schedule for the location.

Instructors: Njal Rollinson, njal.rollinson@utoronto.ca

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TAs: Vasa Lukich, vasa.lukich@mail.utoronto.ca (Earth Science)

Karl Lamothe, karl.lamothe@mail.utoronto.ca (Ecology and Evolutionary Biology)

Ellen Gute, ellen.gute@mail.utoronto.ca (Chemistry)

Office hours: can be scheduled by appointment by emailing the appropriate instructor or TA

Website: We will communicate with you using the course Blackboard 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 Blackboard site.

Evaluations:

Three R assignments: (5%, 5%, 10%)	20 %
Five short reports for 10 % each	50 %
Final project oral presentation (in class Dec 2)	10 %
Final project written report (due 5 pm Dec 6)	20 %

Final Project & Presentation: You will apply skills and concepts developed in the course to an environmental science issue while working with a large dataset. Your project will focus on an Ecology-themed project, or an Environmental Chemistry-Themed Project. The written component will be 3000-4000 words, in addition to relevant tables, figures, and references. The oral presentation will be performed in class, will be 10 minutes in duration, and will be supported by a Power Point slideshow.

Late work policy: Short reports are due at the beginning of the lab period on the dates listed above. Work handed in late will be penalized at 10% per day, including the weekend. Late work can be submitted to Prof. Rollinson in RW 510, to Prof. Wunch in MP 707A, or via Blackboard, as appropriate.

Date	Week	Lab Activities	Location	Due date for
Sep 16	1	Introduction, preparation for field sampling R Tutorial 1	RW 107	
Sep 23	2	Field sampling at the Humber River *	Humber River	R Homework 1
Sep 30	3	Subsampling, weighing, and drying of core R Tutorial 2	ES 2095 RW 107	
Oct 7	4	Passive sampler prep and IC calibration	LM 6	R Homework 2
Oct 14	5	Toronto Atmospheric Observatory and data analysis	RW 107 and TAO	R Homework 3
Oct 21	6	Invertebrate classification Ecology data analysis 1	ES 1027 RW 107	Mauna Loa Report
Oct 28	7	Ecology data analysis 2 Introduction to final project	RW 107	Ecology report 1
Nov 4	8	Core sample prep, submit for CN analysis, LOI Work on final project	ES 2095	Ecology report 2
Nov 11	9	Sediment core particle sizing / IC analysis of passive samplers	ES 2095 / LM 6	
Nov 18	10	IC analysis of passive samplers / Sediment core particle size	LM 6 / ES 2095	Sediment core report / Passive sampler report
Nov 25	11	Feedback on analysis for final report	RW 107	Passive sampler report / Sediment core report
Dec 2	12	Final project oral presentations	ES1016M	
Dec 6		Submit final project report via ENV Drop Box**		Final project report

* If bad weather prevents the field sampling on Sep 23, it will be rescheduled for Sep 30. In this case, the group will meet in ES 2095 on Sep 23 and some of the activities planned for Week 3 will be substituted. You should consult the course Blackboard site at 9:00 on the morning of Sep 23 to determine if field sampling will take place.

**There is an assignment drop box inside the admin office (ES1016V), in the 33 Willcocks wing of Earth Sciences. Note that assignments must be dropped off no later than 6pm on Dec 6, or will be subject to late penalties.

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:

<http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjun011995.pdf>

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>

Absences: Students who miss lab periods, for legitimate reasons or otherwise, are responsible for making up the missed material. Students who miss a presentation or report deadline should contact Professor Rollinson or Professor Wunch as soon as possible, and no later than one week after returning to class. A legitimate reason for an absence or missed deadline due to medical, personal, or family reasons should be documented by one of the following: 1) U of T Student Medical Certificate; 2) Student Health or Disability Related Certificate; 3) College Registrar's Letter; or 4) Accessibility Services Letter

Lab Notebook: You are required to maintain a lab notebook to keep a concise record of your activities in the lab or in the field. This information will provide important context for the interpretation of the results in your lab reports.

Lab Safety: During some of the laboratory periods, we will be working with potentially dangerous chemicals. If handled correctly, these compounds pose little or no danger in a laboratory setting. However carelessness could lead to serious consequences. With this in mind, no food or drinks are permitted in the lab. Long pants and close-toed shoes must be worn, as well as eye protection when required. Keep the lab bench clear of non-essential items. Make sure to dispose of all solutions and samples as directed by the TA at the end of each lab period. Clean up any spills immediately and thoroughly. If you have any questions or concerns, ask a TA or instructor.