

## **Environmental Science: Approaches and Methods in Research**

EES1201H

Class: Monday 14:00 - 17:00

[Course Website](#)

*I wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca, and most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.*

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### **Instructor**

Prof. Cody A. Ross

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Office: EV443

Office Hours: TBD

### **Location & Time**

- Lectures are on Mondays 14:00 - 17:00 in EV502

### **Overview**

This course introduces major theories, concepts, methods, and intellectual and creative traditions within environmental science research. There is a particular focus in this course on the critical evaluation of existing knowledge, oral and written communication skills, teamwork, and the ethical and professional responsibilities of environmental scientists.

### **Learning Objectives**

By the end of EES1201H, you will be able to:

- Interpret and critically evaluate peer-reviewed journal articles on environmental science topics.
- Synthesize scientific literature from multiple sources.
- Identify knowledge gaps in a discipline.
- Formulate hypothesis and research questions.
- Design studies and experiments that are well matched to specific hypotheses.

- Effectively communicate scientific topics and results in verbal and written forms.
- Understand the validity and limitations of field measurements.
- Select appropriate statistics and visualizations for conveying and analyzing environmental data.

## Expectations

What I expect of you:

- Treat peers and me with respect.
- Take full responsibility for your own learning.
- Recognize you are not merely a spectator of your education.
- Be present, on time, and prepared for every class.
- Complete all work on time with significant effort.
- Ask questions.
- Contribute to a positive learning environment.

What you can expect of me:

- Clear instructions for course activities.
- Prepared for every class.
- Available during office hours.
- Lectures and activities planned to help you meet the course learning objectives.
- Timely, detailed, and constructive feedback.

## Textbook and Resources

Weekly readings will be assigned from [\*Exploring Research by Neil J. Salkind \(9<sup>th</sup> edition\)\*](#). Physical and digital copies are available through the University bookstore. In addition to the textbook, mandatory seminar-style readings will be prescribed on the course website and in the tentative schedule below.

## Evaluation

Your course grade will comprise participation in course discussion and oral presentations, independent completion and presentation of a literature critique and methodology activity, and a term project. The deadlines are listed in the tentative schedule table.

Participation in discussion and activities	20%
Literature critique activity	20%
Methodology activity	20%
Final project	40%

Participation (20 %): there will be opportunities for discussion during class (15%). Some lectures have mandatory readings, and you will be expected to lead the discussion (5%).

Literature critique (20 %): Students will complete a brief (1-3 page) synopsis and critique on a manuscript of their choice. The report will be submitted on Quercus (10%) and a verbal presentation will be made in class (10%). Students will sign up for the literature critique by Sept. 13, 11:59 PM and submit the manuscript title by Oct. 2, 11:59 PM. The report will be due by 11:59 PM on the selected presentation date.

Methodology activity (20 %): Students will complete a brief (1-3 page) technical description of a methodology/analytic approach of their choice. The report will be submitted on Quercus (10%) and a verbal presentation will be made in class (10%). Students will sign up for the methodology activity by Sept. 13, 11:59 PM. The report will be due by 11:59 PM on the selected presentation date.

Final project (40 %): a literature review on a student-selected topic. The literature review should cover at least 10 peer-reviewed journal articles. 5% will be for a very brief (1 page) proposal, outlining the topic and which journals you anticipate finding articles from. 15% will be for a 15-minute presentation during our last scheduled class on the topic. 20% will be for a 5-10 page literature review. Detailed instructions about the final project will be posted on Quercus.

## Tentative Schedule and Key Dates

Minor changes to the schedule are possible and will be posted on Quercus in advance.

<b>Week 1</b>	<b>MEnvSc Poster Presentation Day - No Class</b>
<p><b>Week 2</b> Lecture: Sept. 18 <i>Sign up for literature critique by Sept. 20, 11:59 PM</i> <i>Sign up for methodology activity by Sept. 20, 11:59 PM</i></p>	<p>Lecture Topic:</p> <ul style="list-style-type: none"> <li>• Course introduction</li> <li>• Libraries presentation (60 min)</li> <li>• Theory and hypothesis</li> <li>• The research process</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Evenson et al. (1979) - Economic benefits from research: An example from agriculture</li> <li>• Salkind (Ch.1 &amp; Ch. 2)</li> </ul>
<p><b>Week 3</b> Lecture: Sept. 25</p>	<p>Lecture topic:</p> <ul style="list-style-type: none"> <li>• Responsibility of an environmental practitioner/researcher</li> </ul> <p>Mandatory readings:</p>

	<ul style="list-style-type: none"> <li>• Hardin (1968) - The tragedy of the commons</li> <li>• Salkind (Ch. 3b)</li> </ul>
<p><b>Week 4</b> Lecture: Oct. 2 <i>Submit title for literature critique by Oct. 2, 11:59 PM</i></p>	<p>Lecture topic:</p> <ul style="list-style-type: none"> <li>• Skepticism, criticism, and being comfortable with changing your mind.</li> <li>• Selecting a problem and reviewing the research</li> <li>• Literature review</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Xiao et al. (2019) - Guidance on conducting a systematic literature review.</li> <li>• Salkind (Ch. 3a)</li> </ul>
<p><b>Week 5</b> <i>Final project proposal due Oct. 9 by 11:59 PM</i></p>	<p><b>University Closed Oct. 9 - No Class</b></p>
<p><b>Week 6</b> Lecture: Oct. 16</p>	<p><i>Student Critique 1</i> Lecture topic:</p> <ul style="list-style-type: none"> <li>• Scientific review: history, process, and outcomes</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Claxton (2005) - Scientific authorship: Part 1. A window into scientific fraud?</li> <li>• Claxton (2005) - Scientific authorship: Part 2. History, recurring issues, practices, and guidelines</li> <li>• Critique article 1 - see Quercus</li> </ul> <p><i>Student Methodology Activity 1</i></p>
<p><b>Week 7</b> Lecture: Oct. 23</p>	<p><i>Student Critique 2</i> Lecture topic:</p> <ul style="list-style-type: none"> <li>• Sampling and Generalizability</li> <li>• Measurement reliability and validity</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Salkind (Ch. 4)</li> <li>• Critique article 2 - see Quercus</li> </ul> <p><i>Student Methodology Activity 2</i></p>
<p><b>Week 8</b> Lecture: Oct. 30</p>	<p><i>Student Critique 3</i> Lecture topic:</p> <ul style="list-style-type: none"> <li>• Research bias, accuracy, and precision</li> <li>• Measurement reliability and validity</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Salkind (Ch. 5)</li> <li>• Critique article 3 - see Quercus</li> </ul> <p><i>Student Methodology Activity 3</i></p>
<p><b>Week 9</b></p>	<p><i>Student Critique 4</i></p>

<p><i>Lecture: Nov. 6</i></p>	<p>Lecture topic:</p> <ul style="list-style-type: none"> <li>• Descriptive and inferential statistics</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Salkind (Ch. 7&amp;8)</li> <li>• Critique article 4 - see Quercus</li> </ul> <p><i>Student Methodology Activity 4</i></p>
<p><b>Week 10</b> <i>Lecture: Nov. 13</i></p>	<p><i>Student Critique 5</i></p> <p>Lecture topic:</p> <ul style="list-style-type: none"> <li>• Non-experimental research methods</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Salkind (Ch.9&amp;10)</li> <li>• Critique article 5 - see Quercus</li> </ul> <p><i>Student Methodology Activity 5</i></p>
<p><b>Week 11</b> <i>Lecture: Nov. 20</i></p>	<p><i>Student Critique 6</i></p> <p>Lecture topic:</p> <ul style="list-style-type: none"> <li>• Experimental research methods</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Salkind (Ch. 11&amp;12)</li> <li>• Critique article 6 - see Quercus</li> </ul> <p><i>Student Methodology Activity 6</i></p>
<p><b>Week 12</b> <i>Lecture: Nov. 27</i></p>	<p><i>Student Critique 7</i></p> <p>Lecture topic:</p> <ul style="list-style-type: none"> <li>• Writing a research manuscript</li> <li>• Publishing</li> </ul> <p>Mandatory readings:</p> <ul style="list-style-type: none"> <li>• Salkind (Ch. 14)</li> <li>• Critique article 7 - see Quercus</li> </ul> <p><i>Student Methodology Activity 7</i></p>
<p><b>Week 13</b> <i>Lecture: Dec. 4</i> <i>Final project due Dec. 8 by 11:59 PM</i></p>	<p>Literature review presentations</p>

## Academic Integrity

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjun011995.pdf>) outlines the behaviours that constitute academic

dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

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

On tests and exams:

- Using or possessing unauthorized aids;
- Looking at someone else's answers during an exam or test;
- Misrepresenting your identity; and
- When you knew or ought to have known you were doing it.

In academic work:

- Falsifying institutional documents or grades;
- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes; and
- When you knew or ought to have known you were doing so.
- All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If students have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, they are expected to seek out additional information on academic integrity from their instructors or from other institutional resources.

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>)



In this course, generative AI can be used in certain instances or specific ways.

Students may use artificial intelligence tools for creating an outline for an assignment, but the final submitted assignment must be original work produced by the individual student alone.

## **Accessibility**

Students with diverse learning needs are welcome in this course. I strive to create a classroom environment that is welcoming and inclusive and have considered this as I designed the course. However, if you still find you need accommodations due to a disability/health consideration please feel free to approach me and/or the *AccessAbility* Services Office as soon as possible.

*AccessAbility* Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email [ability.utsc@utoronto.ca](mailto:ability.utsc@utoronto.ca). The sooner you let me know your needs the quicker I can assist you in achieving your learning goals in this course.

## **Equity at the University of Toronto**

The University of Toronto is committed to equity and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect. As a Course Instructor, I will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment and hate speech will not be tolerated. If you have any questions, comments, or concerns, you may contact the UTSC Equity and Diversity officer at [edio.utsc@utoronto.ca](mailto:edio.utsc@utoronto.ca) or the University of Toronto Scarborough Students' Union Vice President Equity at [equity@scsu.ca](mailto:equity@scsu.ca).