School of Science

ENVS 101

Introduction to Environmental Science 2

Winter 2026

3 Credits

Course Outline

INSTRUCTOR: Scott Gilbert, BSc., Ph.D.; Vladimir Kabanov, Ph.D.

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LECTURE: Mon / Wed 10:30-noon **Room**: A2408 **Dates:** Jan. 7 – April 15
LAB: Tuesday 2:30-5:30 **Room:** A2801 **Dates:** Jan. 13 – April 14

COURSE DESCRIPTION

Environmental Science 101 is a companion course to ENVS 100; it is designed for students who are not pursuing a science program but who wish to learn more about the effects of human activities on the environment. Students will be able to apply the basic concepts that were presented in ENVS 100 to investigate a variety of environmental problems at both the local and global level.

There will be four major units in this course. Firstly, energy supply options and the relative impacts of these options on the environment. With changing global energy economies, considering options for reducing dependence on certain energy types in order to lessen additions to global climate feedbacks is an increasingly integral challenge to northern lifestyles. Secondly, an introduction to basic concepts of organic chemistry and how contaminants such as DDT and PCB's have impacted northern ecosystems. Thirdly, the importance of the water cycle and groundwater, as well as problems of water pollution from domestic agriculture and industrial sources. And lastly, the practical aspects of environmental protection and an introduction to conservation biology and environmental regulation.

PREREQUISITES

Admission to an academic program within the School of Science or School of Liberal Arts.

EQUIVALENCY OR TRANSFERABILITY

SFU	SFU GEOG 1XX (3), Physical A
TRU	TRU BIOL 1XXX (3)
UAS	Physical Geog Elec (3)
UBC	UBC GEOG 1st (3). Not for credit in Science
UR	Geog 200 (3)
UVIC	UVIC ES 1XX (1.5)

See https://bctransferguide.ca/ for an up to date list of transfers within BC. Further information

and assistance with transfers may be available from the School of Science.

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- Use library resources to research and critically assess an environmental topic.
- Write a basic scientific report to describe the outcome of a field or laboratory study using a standard format of Introduction, Methods, Results and Discussion.
- Name simple organic molecules, describe the combustion reaction of alkanes, recognize functional groups and isomers, and understand the structural aspects of PCB's that influence their toxicity.
- Develop a simple cost-benefit analysis of energy-conservation related proposal including a matrix that lists relevant externalities.
- Summarize the range of issues surrounding an environmental question including ethical perspectives, questions of sustainability and underlying biological and chemical factors.

COURSE FORMAT

Lectures: Three hours per week (2 classes of 1.5 hours, face to face).
Labs: Three hours per week, face to face. Activities vary and will include chemistry lab demonstrations, tutorials on problem sets, guest lectures and class presentations.

ASSESSMENTS:

Attendance & Participation

Students are expected to attend both lectures and the scheduled activities during the lab period. Several of the lab exercises involve collecting data or making observations and this would make it difficult or impossible for students who miss the lab to complete the lab assignment. There is a strong correlation between regular attendance and academic performance.

Assignments

There will be weekly short class quizzes and take home assignments and most lab activities will require submission of written assignments. Students must pass the lab portion of the course if they wish to receive a passing grade for the overall course.

Tests

Rather than a mid-term examination we will have a short test at the end of three of the modules. The final exam will be comprehensive and cover all topics taken up during the term.

EVALUATION:

Short in-class quizzes	5%
Take home readings & questions	15%
Field / lab exercises	30%
Quiz (3 modules @ 8, 8, 9%)	25%
Final Exam	25%
Total	100%

COURSE WITHDRAWAL INFORMATION

The last date to withdraw without academic penalty is March 5, 2026. Refer to the YukonU website for other important dates https://www.yukonu.ca/admissions/important-dates

REQUIRED TEXTBOOKS AND MATERIAL

Freedman, Bill. 2018. *Environmental Science: A Canadian Perspective*. 6th Edition The text is available as a free download in various formats under a Creative Commons licence. See: https://digitaleditions.library.dal.ca/environmentalscience/

Flowers,P., Theopold, K., Lanley, R. & Robinson, W. 2019 – *Chemistry.* Chapter 20 will be provided on our course website. Full text is also available: https://openstax.org/details/books/chemistry

Weekly lab activities and additional readings will be available on the course web site.

ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document. Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities. https://www.yukonu.ca/policies/academic-regulations

ACADEMIC ACCOMMODATION

Yukon University is committed to providing a positive, supportive, and barrier-free academic environment for all its students. Students experiencing barriers to full participation due to a visible or hidden disability (including hearing, vision, mobility, learning disability, mental health, chronic or temporary medical condition), should contact Accessibility Services for resources or to arrange academic accommodations: access@yukonu.ca.

TOPIC OUTLINE

ENVS 101 - Lecture Topics & Readings[1] *Draft Nov 27*

Date M/W	Lect	Topic
		Module I - Environmental Protection - Scott Gilbert
Jan. 7	1	Term overview. Environmental Health & Toxicology **Readings:** pp 576-587
Jan. 12	2	Intro to systems analysis & feedback loops in natural systems
Jan. 14	3	Intro to Cost-Benefit Analysis & Externalities
Jan. 19	4	Island biogeography and preserving biodiversity **Readings:** Chapter 7 + 27
Jan. 21	5	Sustainability: do we need more regulations – Jurisdictions & RRM **Readings:** Draper & Zimmerman (2017) Ch. 5; Boyd (2015) Ch. 2; U of Ottawa webpage
Jan. 26	6	Environmental regulations – Part 2 – Tools
		Module II -Water – Scott Gilbert
Jan. 28	7	Intro - Overview of threats to surface and ground water, quantity and quality; Chemical properties of water Chapter 1[2] in *Northern Waters*,
Feb. 2	8	Hydrology & Ground Water Resources (posted on Moodle – no in person class)
Feb. 4	9	Impacts of Hydro Dams Readings – text Chapter 20 + von Finster & Reid (2015)
Feb. 9	10	Water pollution & eutrophication **Readings:** text Chapter 20
Feb. 11	11	Impacts of Oil Spills **Readings:** text Chapter 21
Feb. 12	12	Waterborne pathogens – **Readings:** Chapter 7 in *Northern Waters*
Feb. 16	13	Water conclusion
		Module III – Contaminants & Organic Chemistry – Vladimir Kabanov
Feb. 18	14	Chemistry review: ionic and covalent bonds. Why is there such diversity of carbon compounds?
Feb. 23	15	Introduction to alkanes, alkenes, alkynes, cycloalkanes
Feb. 25	16	Combustion of alkanes & balancing equations Readings: pp 602-603
Mar. 2	17	Isomers
Mar. 6-16	Reading Week – Arctic Winter Games – campus closed	

[1] Freedman, Bill. 2018. *Environmental Science: A Canadian Perspective*. 6th Ed.

2 Readings from *Northern Waters: A Guide to Designing and Conducting Water Quality Monitoring in Northern Canada*. 2005. EMAN-North

Mar. 18	18	Benzene, functional groups
Mar. 23	19	PCB's - structure and toxicity; chiral compounds and stereochemistry
Mar. 25	20	Chemistry conclusion
Module IV – Energy - Vladimir Kabanov		
Mar. 30	21	Intro to Energy Module: What is energy? Units of measurement Readings: Chap 13
Apr. 1	22	Energy Choices: Lovins – soft & hard path. Template for energy choices – diesel Readings: pp 75-77; 314-315; 464-465; 609-610
Apr. 6	Holiday - Easter Monday	
Apr. 8	23	Wind Energy & Nuclear Energy – Small Modular Reactors
April 13	24	Geothermal, Demand Side Mgmt, Carbon Capture Sequestration & Geoengineering
April 15	25	Energy Wrap Up

Schedule of Lab Activities

Tuesdays	Topic
Jan. 13	Lab #1 - Heat Loss of Winter Footwear
Jan. 20	Tutorial #2 - Island biogeography simulation & Habitat Fragmentation workshop
Jan. 27	Tutorial #3 - Snow ecology (outdoors) & hydrology data analysis (indoors)
Feb. 3	***Quiz**: Environmental Protection //* Video: *Shadow of A Giant* - Arsenic trioxide
Feb. 10	Tutorial #4 - enVision groundwater model & questions on water regulation
Feb. 17	***Quiz:** Water //* Intro to Adaptive Management
Feb. 24	Organic Chemistry Tutorial I
Mar. 3	Organic Chemistry Tutorial II
Mar. 6-16	Reading Week – Arctic Winter Games
Mar. 17	Organic Chemistry Tutorial III + Solubility demonstration in Chemistry Lab
Mar. 24	***Quiz:** Organic Chemistry*
Mar. 31	Energy conservation tutorial
April 7	Workshop – energy alternatives
April 14	Wrap Up Lecture & Review Session