



School of Science
ENVS 100
Introduction to Environmental Science
Fall 2022
3 Credits

Course Outline

INSTRUCTOR: Scott Gilbert, BSc., Ph.D.

E-MAIL: sgilbert@yukonu.ca

OFFICE: A2515

PHONE: 867-668-8776

OFFICE HOURS: Tues / Thurs 10:35-11:35 or by arrangement via email.

LECTURE: Mon / Wed 10:30 -noon **Room:** Lecture Hall (A2206) **Dates:** Sept. 7 – Dec. 7

LAB: Thurs

Room: A2801 **Dates:** Sept. 9 – Dec 2

COURSE DESCRIPTION

Environmental Science 100 is specifically designed for students who are not pursuing a science program but who wish to learn more about the physical and biological processes that shape our environment. Our planet, and its living and non-living parts, makes up the biosphere, which itself is a complex web of interactions. We investigate these interrelationships by studying the underlying processes in terms of their biology and chemistry.

The course has two goals. First to explain some of the basic concepts in ecology and chemistry and secondly to show how these concepts can help understand four or five of the critical problems facing our world: the size and growth rate of the world's population, atmospheric problems (global warming, thinning of the ozone layer and acid precipitation) and sustainability of the world's agricultural and forestry industry.

COURSE REQUIREMENTS

Prerequisite(s): Admission to an academic program within the School of Science or School of Liberal Arts.

Lectures and lab activities during Fall 2022 are planned as face-to-face classes.

EQUIVALENCY OR TRANSFERABILITY

UBC	Geog (3)	SFU	BISC 1xx (3)
UAF	Nsci Elec (n) (3)	UAS	Physical Geog Elec (3)
UR	Geog 100L (3) or Esci 200L (Educ. Students)		
UNBC	Envs 1xx (3) or with ENVS 101 = Envs 100 (3) & Envs 1xx (3)		
UVIC	Es 100L (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

Students that successfully complete this course will be able to:

- Describe the basic processes and interrelationships that govern our biosphere.
- Be able to research environmental topics and prepare verbal and written arguments.
- Outline the range of environmental problems confronting the world and identify potential solutions at a variety of levels (as individuals, locally and globally.)

COURSE FORMAT

Lectures: Three hours per week (2 classes of 1.5 hours, face to face). Efforts will be made to record and post the Zoom lectures online after class but students should participate in each class rather than relying on the video archive.

Labs: Three hours per week, face to face, with physical distancing as required. There will be a total of eight or nine activities during the term.

Attendance & Participation

Students are expected to attend both lectures and the scheduled activities (including field activities). 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 short, weekly take-home assignments and the field/lab activities involve written assignments. Students must pass the field/lab portion of the course to receive a passing grade for the overall course. A book review exercise will be assigned early in the term.

Tests

Rather than a single mid-term examination we will have two shorter quizzes. The final exam, to be scheduled between Dec. 8th and 20th, will be comprehensive and cover all topics taken up during the term.

EVALUATION

Book review assignment	5%
Short in-class quizzes	5%
Take home readings & questions	10%
Field / lab exercises	25%
Midterm exams (2 @15% each)	30%
Final Exam	25%
Total	100%

COURSE WITHDRAWAL INFORMATION

The Last date to withdraw without academic penalty is Nov. 4, 2022. Refer to the YukonU website for other important dates. <https://www.yukonu.ca/admissions/important-dates>

TEXTBOOKS & LEARNING MATERIALS

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/> A course manual will be distributed during the first lab session 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

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon University Academic Regulations (available on the Yukon University website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC): lac@yukonu.ca.

TOPIC OUTLINE

ENVS 100 -2022 Lecture Outline* Aug 17 version

Date	Topic	Readings
Sept. 7	Introduction: environmental science, ecology, sustainable development, ecological footprint, I=PAT, worldviews.	Chapter 1
Sept. 12	Scientific method and hypothesis testing. Succession	Chapter 2. Dearden & Mitchell 2016 Chapter 3 on Succession
Sept. 14	Physical world: hydrosphere & atmosphere. Introduction to key ecological concepts	Chapter 3 pp 49-56
Sept. 19+21	Energy flow through ecosystems: ecosystem structure, photosynthesis, consumers, decomposers. Nutrient flows.	Chapter 4 pp 60, 62, 64-66, 69-76
Sept. 26+28	Questions of abundance: Animal populations – density, mortality and birth rates. Human populations – historical view of Malthus	pp. 15-18, 39-52, 120-
Oct. 3 + 5	Human populations - population growth and questions of sustainability.	Chapter 2, pp 39-55
Oct. 10	Thanksgiving holiday -	

Oct. 12	Chemistry #1: What is chemistry? Basic def'ns – matter, elements and compounds, mixtures. Simple model of atomic structure – nucleus, protons, neutrons, electrons, atomic number, periodic table, isotopes. Intro to carbon cycle & GHGs	Timberlake & Timberlake - Chap 3
Oct. 17	Chemistry #2: Orbitals and electron configuration, ions, octet rule, balancing chemical formulae, law of conservation of mass. Setting goals for GHG reductions - friction between developed & developing countries	Timberlake & Timberlake - Chap 4
Oct 19	Chemistry #3, Molecular mass, photosynthesis eq'n, mole, Avogadro's #r. Electronegativity, covalent bonds. Intro to acid precipitation & acid mine drainage	
Oct 24	Chemistry #4: Acid base reactions, proton donors and proton acceptors, pH, indicators, buffers. Molarity, solvent solute. Acid precipitation – impacts on terrestrial & aquatic ecosystems	pp. 450-452
Oct. 26	Dr. Guillaume Nielsen – lecture on chemistry & Yukon mine remediation; building a small-scale bioreactor.	
Oct. 31	Chemistry #5: Acid precipitation -solutions. Intro to the problem of ozone loss in the stratosphere, Montreal Protocol	pp. 85-86 (carbon cycle), Chapter 17
Nov. 2	Chemistry #6: Ozone – High & low. Intro to air pollution in the troposphere - 7 criteria chemicals – SO ₂ , NO _x , PM _{2.5} , VOCs, CO, NH ₃ , , photochemical smog & ozone	Chapter 16
Nov. 7	Agriculture: historical survey of trends. Impacts of agriculture: nutrient cycles, deforestation, energy consumption	pp 471-485
Nov. 9	Quiz 2 - Chemistry	
Nov. 14	Agriculture continued	
Nov 16	Contaminants in northern ecosystems - Guest lecturers: Mary Gamberg & Pascale Savage [Date to be confirmed]	Chapter 24
Nov. 21	Review Midterm # 2 - Agriculture conclusion	Chapter 24
Nov. 23	Survey of forestry practices - Carbon budgets and agricultural and forestry practices	Chapter 23
Nov. 28	Pesticides in agriculture and forestry: What are they? Why do we use them? What are the disadvantages?	Chapter 22
Nov. 30	Alternatives to pesticides - Integrated Pest Management (IPM), bio control, changes in land culture practices	
Dec. 5	IPM conclusion	
Dec. 6 Tues	Course summary Classes run on a Monday schedule to make up for Thanksgiving	

* Readings based on your E-text: Freedman 2018 - *Environmental Science: A Canadian Perspective*. 6th Ed

ENVS 100 – Lab Activity Schedule

Please read over the background information and directions for each activity before class. Experience shows that students who forget to prepare for the lab ahead of time, by doing the readings, get confused and frustrated. Take the time to prepare so you can get the most out of these activities.

Date	Activity
Sept. 9	Group A McIntyre Creek Vegetation field survey - meet in A2801 <i>Group B: Library Tour at 2:30 - Library Research Assignment due next Thursday*</i>
Sept. 16	Group A Library Tour at 2:30 - Library Research Assignment due next Thursday <i>Group B McIntyre Creek Vegetation field survey - meet in A2801*</i>
Sept. 23	If small class schedule library here and do McIntyre on Sept 16
Sept. 30	National Day for Truth and Reconciliation Holiday – no classes
Oct. 7	Quiz I
Oct. 14	Boreal Trail walk - Living with the neighbours: Soapberry bushes as a bear attractant on campus
Oct. 21	Tragedy of the Commons workshop
Oct. 28	Chemistry Lab 1 : Starting a bioreactor (Dr. Guillaume Nielsen & Ben McGrath)– YRC lab
Nov 4	1:00-2:25 Chemistry #7: Black Carbon. How to reduce unwanted emissions. Review.
Nov. 11	Holiday – no classes - Remembrance Day
Nov 18	Contaminants exercise with Mary Gamberg and Pascale Savage
Nov. 25	Chemistry Lab 2: Assessing the bioreactors (Dr. Guillaume Nielsen & Ben McGrath) – YRC lab
Dec. 2	Optional review session
Dec. 7 Wed	Make up for Nov 11 holiday – no lab scheduled. Exams start Dec 8 th !

- Class size will determine whether we need to split the class in to two groups. TBD