



School of Science
ENVS 100
Introduction to Environmental Science
Fall 2021
3 Credits

Course Outline

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OFFICE HOURS: Tues / Thurs 10:35-11:35 via Zoom. Link provided on course web site

LECTURE: Mon / Wed 10:30 -noon **Room:** A2103 **Dates:** Sept. 8 – Dec 6

LAB: Thurs

Room: A2202 **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.

PREREQUISITES

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

RELATED COURSE REQUIREMENTS

Lectures and lab activities during Fall 2021 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). If technically possible, a video recording of the lectures will be made available online after class but students should participate in each class rather than relying on a possible video archive.

Labs: Three hours per week, face to face, with physical distancing as required. There will be a total of seven or eight activities during the term. Students are encouraged to obtain two COVID-19 vaccines.

ASSESSMENTS:

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 several short 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 during Dec. 10-22, will be comprehensive and cover all topics taken up during the term.

EVALUATION:

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

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/> A course manual will be distributed during the first lab session and additional readings will be available on the course web site.

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/ Admissions & Registration web page.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when a student submits work for credit that includes the words, ideas, or data of others, without citing the source from which the material is taken. Plagiarism can be the deliberate use of a whole piece of work, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Students may use sources which are public domain or licensed under Creative Commons; however, academic documentation standards must still be followed. Except with explicit permission of the instructor, resubmitting work which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the University.

YUKON FIRST NATIONS CORE COMPETENCY

Yukon University recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon University program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukonu.ca/yfnccr.

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 -2021 Lecture Outline* - Aug. 18 version

Date	Topic	Readings
Sept. 8	Introduction: environmental science, ecology, sustainable development, ecological footprint, I=PAT, worldviews.	Chapter 1
Sept. 13	Scientific method and hypothesis testing. Succession	Chapter 2. Dearden & Mitchell 2016 Chapter 3 on Succession
Sept. 15	Physical world: hydrosphere & atmosphere. Introduction to key ecological concepts	Chapter 3 pp 49-56
Sept. 20 + 22	Energy flow through ecosystems: ecosystem structure, photosynthesis, consumers, decomposers. Nutrient flows.	Chapter 4 pp 60, 62, 64-66, 69-76
Sept. 27 + 29	Questions of abundance: Animal populations – density, mortality and birth rates. Human populations – historical view of Malthus	pp. 15-18, 39-52, 120-
Oct. 4 + 6	Human populations - population growth and questions of sustainability.	Chapter 2, pp 39-55
Oct. 11 Thanksgiving holiday -		
Oct. 13	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. 18	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 20	Chemistry #3, Molecular mass, photosynthesis eq'n, mole, Avogadro's #r. Electronegativity, covalent bonds. Intro to acid precipitation & acid mine drainage	
Oct. 25	Dr. Guillaume Nielsen – lecture on chemistry & Yukon mine remediation; building a small-scale bioreactor. (Date tentative)	
Oct 27	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
Nov. 1	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. 3	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. 8	Chemistry #7: Black Carbon. How to reduce unwanted emissions - policy options, double dividends, Project Drawdown.	pp 419-422
Nov. 10	Agriculture: historical survey of trends. Impacts of agriculture: nutrient cycles, deforestation, energy consumption	pp 471-485
Nov. 15	Agriculture continued	Chapter 24
Nov 17	Agriculture conclusion	Chapter 24
Nov. 22	Survey of forestry practices - Carbon budgets and agricultural and forestry practices	Chapter 24
Nov. 24	Contaminants in northern ecosystems - Guest lecturers: Mary Gamberg & Pascale.Savage (Date tentative)	Chapter 23
Nov. 29	Pesticides in agriculture and forestry: What are they? Why do we use them? What are the disadvantages?	Chapter 22
Dec. 1	Alternatives to pesticides - Integrated Pest Management (IPM), bio control, changes in land culture practices	
Dec. 6	Course summary	
Dec. 8 Wed	TBD 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 A2202 Group B: Library Tour at 2:30 - Library Research Assignment due next Thursday
Sept. 16	Group A Library Tour at 2:30 - Library Research Assignment due next Thursday Group B McIntyre Creek Vegetation field survey - meet in A2202
Sept. 23	** Make up lecture for Sept 30 th holiday – 90 minutes
Sept 29	** Population growth – tutorial during regular lecture period – 90 minutes
Sept. 30	Truth and Reconciliation Day 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	TBD
Oct. 28	Chemistry Lab 1 : Starting a bioreactor – YRC lab*
Nov 4	Tragedy of the Commons workshop
Nov. 11	Remembrance Day holiday
Nov 18	Chemistry Lab 2: Assessing the bioreactors – YRC lab*
Nov. 25	Quiz II
Dec. 2	Contaminants exercise with Mary Gamberg and Pascale Savage*
Dec. 9	Make up Thursday for Nov 11 holiday – no lab scheduled. Exams start Dec 10 th !

* Scheduling of labs marked with a single asterisk is tentative and dates will be confirmed in September.