



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

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## Course Outline

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**OFFICE:** A2515

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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

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### 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](http://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](mailto: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  |
| <b>Oct. 11 Thanksgiving holiday -</b> |   |  |
| 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 <sub>2</sub> , NO <sub>x</sub> , PM <sub>2.5</sub> , VOCs, CO, NH <sub>3</sub> , , 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<br>Wed | TBD <b>Classes run on a Monday schedule to make up for Thanksgiving</b>  |            |

\* 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<br>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<br>Group B McIntyre Creek Vegetation field survey - meet in A2202  |
| Sept. 23 | ** Make up lecture for Sept 30 <sup>th</sup> holiday – 90 minutes   |
| Sept 29  | ** Population growth – tutorial during regular lecture period – 90 minutes  |
| Sept. 30 | <b>Truth and Reconciliation Day holiday – no classes</b>  |
| Oct. 7   | <b>Quiz I</b>   |
| 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 | <b>Quiz II</b>   |
| 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 <sup>th</sup> ! |

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