

APPLIED SCIENCE & MANAGEMENT DIVISION  
ENVS 101  
3 Credit Course  
Winter, 2020



## COURSE OUTLINE

ENVS 101

AN INTRODUCTION TO ENVIRONMENTAL SCIENCE II

3 CREDITS

PREPARED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

Scott Gilbert, Instructor

APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

Stephen Mooney, Acting Dean

APPROVED BY ACADEMIC COUNCIL: \_\_\_\_\_

RENEWED BY ACADEMIC COUNCIL: \_\_\_\_\_



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ENVS 101  
3 Credit Course  
Winter, 2020

## AN INTRODUCTION TO ENVIRONMENTAL SCIENCE II

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**INSTRUCTOR:** Scott Gilbert, B.Sc., Ph.D.  
Meagan Grabowski, M.Sc.

**OFFICE HOURS:** Mon. & Wed. 9:30-10:30  
or by appointment

**OFFICE LOCATION:** A2515

**CLASSROOM:** Lecture - unknown  
Lab - unknown

**E-MAIL:** [sgilbert@yukoncollege.yk.ca](mailto:sgilbert@yukoncollege.yk.ca)  
[mgrabowski@yukoncollege.yk.ca](mailto:mgrabowski@yukoncollege.yk.ca)

**TIME: Lecture:** Mon & Wed, 10:30 - Noon  
**Lab:** Tuesday, 2:30 - 5:30pm

**TELEPHONE:** (867) 668-8776

**DATES:** Jan 6 - April 8, 2020

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### 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, an introduction to basic concepts of organic chemistry and how contaminants such as DDT and PCB's have impacted northern ecosystems. Secondly, 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. Thirdly, the practical aspects of environmental protection and an introduction to conservation biology and environmental regulation. And lastly, the importance of the water cycle and groundwater, as well as problems of water pollution from domestic agriculture and industrial sources.

### PREREQUISITES

Admission to the School of Science or Liberal Arts.

### EQUIVALENCY/TRANSFERABILITY:

**SFU** SFU GEOG 1SECTNA (3)

**UAS** Physical Geog Elec (3)

**UBC** UBC GEOG 1st (3). Not for credit in Science

**UNBC** Envs 1xx (3) or with ENVS 101 = Envs 100 (3) & Envs 1xx (3)

**UR** Geog 200 (3)

**UVIC** UVIC ES 100 lev (1.5)

See the website <http://bctransferguide.ca/> for a more complete list of transfers within BC.

### 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.

### DELIVERY METHODS/FORMAT

Two members of the School of Science will teach the course using a team-teaching approach and several steps have been taken to ensure that this multidisciplinary approach is well integrated. Lectures are classroom based and lab period activities vary and will include chemistry lab demonstrations, tutorials on problem sets, guest lectures and class presentations.

### COURSE FORMAT

Lectures: Three hours per week (2 classes of 1.5 hours)

Labs: Three hours per week

### COURSE REQUIREMENTS

#### ASSESSMENTS

##### Attendance

Students are expected to attend both lectures and the scheduled activities (including field trips). 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 & TESTS

There will be several short class quizzes and take home assignments and some field/lab activities may require written assignments. Rather than a mid-term examination we will have a short test at the end of three of the modules. Students must pass the lab portion of the course if they wish to receive a passing grade for the overall course. The final exam has been scheduled for April 23 (9:00-noon) and will be comprehensive and cover all topics taken up

during the term.

|                             |            |                                       |
|-----------------------------|------------|---------------------------------------|
| Class participation quizzes | 6          |                                       |
| Term paper                  | 15         |                                       |
| Quiz (3 total)              | 24         |                                       |
| Lab activities              | 25         | Must obtain a minimum of 50% to pass. |
| Final examination           | <u>30</u>  |                                       |
| <b>Total</b>                | <b>100</b> |                                       |

#### REQUIRED TEXTBOOKS/MATERIALS:

Freedman, Bill 2018. *Environmental Science: A Canadian Perspective*. 6<sup>th</sup> 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* 2<sup>nd</sup> Ed. Chapter 20 will be provided on our course website. Also available: <https://openstax.org/details/books/chemistry>

#### ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted as of Dec 2019 under the [Admissions](#) web page.

#### PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper 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 College.

#### YUKON FIRST NATIONS CORE COMPETENCY

Yukon College 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 College program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see [www.yukoncollege.yk.ca/yfnccr](http://www.yukoncollege.yk.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 College Academic Regulations. 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) at (867) 668-8785 or [lassist@yukoncollege.yk.ca](mailto:lassist@yukoncollege.yk.ca).

**ENVS 101 - Lecture Topics & Readings<sup>1</sup>** Dec 22, 2019 - Version E

| Date   | Lect | Topic   |
|--|------|---|
| Jan. 6                                       | 1    | <b>SG1:</b> Intro. Toxicity and risk assessment <b>Text:</b> Chap 15, pp 347-363  |
| <b>Module I - Organic Chemistry</b>          |      |   |
| Jan. 8                                       | 2    | <b>SG2:</b> Chemistry review: ionic and covalent bonds. Why such diversity of carbon compounds? Introduction to alkanes, alkenes, alkynes, cycloalkanes |
| Jan. 13                                      | 3    | <b>SG3:</b> Combustion of alkanes & balancing equations   |
| Jan. 15                                      | 4    | <b>SG4:</b> Isomers   |
| Jan. 20                                      | 5    | <b>SG5:</b> Benzene, functional groups  |
| Jan. 22                                      | 6    | <b>SG6:</b> PCB's - structure and toxicity; chiral compounds and stereochemistry  |
| Jan. 27                                      | 7    | <b>SG7:</b> Organochlorines in northern food chains: LRTAP  |
| <b>Module II - Energy</b>                    |      |   |
| Jan 29                                       | 8    | <b>SG8:</b> Overview of systems analysis and feedback loops in natural systems; Governance and energy policy primer                                     |
| Feb. 3                                       | 9    | <b>SG9:</b> Introduction to externalities and cost-benefit analyses   |
| Feb. 5                                       | 10   | <b>MG1:</b> What is energy? Units of measurement. Overview of renewable and non-renewable energy sources <b>Text:</b> pp 60-64; Chap 14                 |
| Feb. 10                                      | 11   | <b>MG2:</b> Energy choices: Soft versus hard path   |
| Feb. 17                                      | 12   | <b>MG3:</b> Yukon Wind Energy – History and Future Prospects  |
| Feb. 19                                      | 13   | <b>MG4:</b> Nuclear Energy  |
| Feb 24                                       | 14   | <b>MG5:</b> Hydraulic Fracturing – What's the Fracking Problem?   |
| Feb 26                                       | 15   | <b>MG6:</b> Carbon capture and sequestration, geoengineering  |
| <b>Module III – Environmental Regulation</b> |      |   |

<sup>1</sup> Readings are from the course text, Freedman, Bill 2018. *Environmental Science: A Canadian Perspective*. 6th Edition

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|                          |    |   |
|--------------------------|----|---|
| March 2                  | 16 | <b>SG10</b> : Sustainability: do we need more regulations? <b>Text</b> : Chapter 28       |
| March 4                  | 17 | <b>SG11</b> : Tools to encourage compliance with environmental regulations                |
| March 9                  | 18 | <b>SG12</b> : Tools ... continued; Intro to Ecological Economics                          |
| March 11                 | 19 | <b>SG13</b> : Island biogeography and preserving biodiversity <b>Text</b> : pp 754-757    |
| Mar 16-20                |    | Reading Week – Arctic Winter games – no classes   |
| <b>Module IV - Water</b> |    |   |
| March 23                 | 20 | <b>MG7</b> : Chemical properties of water Chap 1 <sup>2</sup> in <i>Northern Waters</i> , |
| March 25                 | 21 | <b>MG8</b> : Water pollution – Chap 7 in <i>Northern Waters</i>                           |
| Mar 30                   | 22 | <b>MG9</b> : Groundwater resources and threats  |
| April 1                  | 23 | <b>MG10</b> : Surface water resources and eutrophication; <b>Text</b> Chapter 20          |
| April 6                  | 24 | <b>MG11</b> : Eutrophication (continued); Video: <i>Save My Lake</i>                      |
| April 8                  | 25 | Last lecture: course summary and wrap up  |
| April 13                 |    | Holiday Monday for Easter – no lecture  |
| April 15                 |    | Classes this Wednesday run on a Friday schedule - no lecture                              |

**Schedule of Lab Activities**

| Tuesdays | Topic   |
|----------|---|
| Jan. 7   | <b>SG1</b> : Heat Loss of Winter Footwear Energy  |
| Jan. 14  | <b>SG2</b> : Organic Chemistry Tutorial I and II  |
| Jan. 22  | <b>SG3</b> : Organic Chemistry Tutorial III + Solubility demonstration in Chemistry Lab   |
| Jan 28   | <b>SG4</b> : <i>Quiz: Organic Chemistry</i> - 60 minutes - Chemical Fact Sheet due today – Intro to cost-benefit calculation exercise |
| Feb. 4   | <b>SG5</b> : Energy conservation tutorial // Finalize term paper topic – Library support available                                    |
| Feb. 11  | <b>MG1</b> : Arsenic trioxide in Yellowknife; Video: <i>Shadow of a Giant</i> // Resource Plan overview                               |

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

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|          |  |
|----------|--|
| Feb 18   | MG2: Group Presentations on Yukon Energy Supply Options                      |
| Feb. 25  | MG3: Yukon biomass energy – why isn't it carbon neutral?                     |
| March 3  | SG6: Quiz: Energy - 45 minutes // Class presentations on term paper progress |
| March 10 | SG7: Island biogeography workshop  |
| March 17 | Reading Week – Arctic Winter games – no lab                                  |
| March 24 | MG5: Quiz: Environmental Regulation (45 minutes)                             |
| March 31 | MG6 Quantitative water exercise  |
| April 7  | MG7: : Field trip to Water Quality Lab (to be confirmed)                     |
| April 14 | Classes run on a Friday schedule so no lab                                   |