

## EESC 101: Environmental Science, 2020 Winter

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### 1. Course Description

This course will introduce students to the **science** to understand the **environment**. Students will learn environmental science **theory** and the **quantitative basis** for the evaluation of environmental issues. Students will learn practical **applications** of these theories in **laboratories, field**, and using **computer models**. The course moves through the revision of the theory, models, evidence, and **discussion** of theoretical, practical, and **ethical** elements in the **understanding** of the environment. Students need to enroll in and successfully pass one of the lab sections in order to successfully pass this course.

### 2. Learning Outcomes

On completion of this course, the student will be able to:

1. **Define** the basic tenants of the **scientific method** and environmental science.
2. **Describe** the **Physical, Chemical, Biological, Ecological, and Social** basic elements of different environmental **systems**.
3. **Describe** the major **natural cycles** and their interactions in environmental systems.
4. **Describe ecosystems** and how they function.
5. **Describe** key tools to assess the state of environmental systems (Life cycle assessment, Carrying capacity, Ecological footprint, Biodiversity, Resource balances, Sankey diagrams).
6. **Interpret** and **build** basic **models** of environmental systems.
7. **Integrate** basic mathematical, statistical, and computational methods to describe and interpret environmental data.
8. **Summarize** environmental systems to address a specific issue.
9. Critically **evaluate** the science basis and arguments regarding environmental issues and **sustainability**.

### 3. Instructor and Logistic Information

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<b>Professor:</b>	Fabian Cid Yañez
<b>E-mail:</b>	fcidyanez@okanagan.bc.ca
<b>Office Hours:</b>	M-T-W, by appointment
<b>Office:</b>	TBD
<b>Lecture Time/Location:</b>	M-W 08:00 - 09:20. Room C344H
<b>Lab Times and Locations:</b>	T 08:00 - 10:50. Room C344H
<b>Course Website:</b>	Moodle.

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## 4. Required Materials

We will use the below open textbooks and software for this course. The textbooks are available in many formats. These are your main references:

- Fisher, Matthew (editor). 2018. *Environmental Biology*. 2nd Edition. Open Oregon. <http://bit.ly/EnvironmentalBiology>
- Freedman, Bill. 2018. *Environmental Science: a Canadian perspective*. Dalhousie University. <https://digitaleditions.library.dal.ca/environmentalscience/>

Additional readings might be assigned from these resources:

- Rogers-Estable, M., Akre, B., Brainard, J., Stewart, R., UCCP AP Environmental Science Course, & Hugues Goosse. (2012). *Introduction to Environmental Science*. CK-12. <https://bit.ly/37r4iYn>
- Theis, T., & Tomkin, J. (2018). *Sustainability: A Comprehensive Foundation*. <https://bit.ly/2ZGBGIO>
- Harvard Smithsonian Center for Astrophysics, & Harvard University Center for the Environment. (2014). *The Habitable Planet A Systems Approach to Environmental Science*. Retrieved from <https://bit.ly/39tf2Hr>
- Carson, R. (1962). *Silent Spring*. Fawcett.

Supplementary readings, videos, or podcasts are noted in the Course Readings document supplementing this course outline. The detailed list is available on Moodle. Readings should be completed before class.

### ***Personal computer***

Although not a requirement, you should bring a laptop to better participate in the classes and labs. Some computers will be available during labs that require the study of computer models.

### ***Netlogo***

During class and lab sessions we will study computational models of some environmental systems. These models are developed using Netlogo (<https://ccl.northwestern.edu/netlogo/>). Netlogo is free and open source software. You are advised to install Netlogo in your personal computers.

## 5. Labs

Labs might take the form of: lab sessions, field trips, or computer models analysis. Lab assignments are available for download on the course website. Lab reports should be submitted on the course website in digital format before the next lab begins. You will have one week to complete each lab. A 5% penalty per day will apply to late submissions unless documented supporting evidence is produced. Assignments submitted more than 1 week late will be assigned a grade of 0.

## 6. Assessment

Your grades will be available on Moodle. According to department policies you must pass (grade of 50% minimum) the lab component of this course in order to pass the course.

<b>Grading</b>	<b>Weight</b>
Quizzes	5%
Expert reading presentation	10%
Midterm	15%
Team project	15%
Lab reports	10%
Lab exam	15%
Final Exam	30%

### **Quizzes**

They will be available on Moodle before or during the corresponding contents being assessed.

### **Expert Reading**

Each student will select a document (magazine or journal article approved by the professor) and present the subject to the class. More details in the corresponding rubric.

### **Midterm**

The midterm helps you assess your growing understanding of environmental science during the course. The exam will have multiple question types (such as multiple choice and short answer) and may be performed as a [two-stage exam](#).

### **Term Project**

An in-depth study of an environmental issue will be carried-out during the semester. Teams of two or three students will address the issue, produce a report and present it to the class. More details regarding requirements and evaluation in the corresponding rubric.

### **Final Exam**

The final exam is a cumulative test on what you have learned this semester. I will provide a review session before the exam.

### ***Class participation, Late Assignments and Excused Absences (retaking tests or submitting late assignments)***

You are expected to fully participate in class (lectures, labs and Moodle). If you are unable to be on-time or present, contact the instructor to accommodate your situation in advance. If you anticipate problems, please let me know in advance so that we can arrange possibilities for you to successfully meet our learning outcomes and complete the course with resources that can help. Any student who misses an exam, project, or assignment due date and wishes to retake or submit an assignment for full credit must discuss options with the professor.

## 7. Course Calendar

All efforts will be made to follow this program. Minor changes might be necessary to accommodate unforeseen circumstances.

Week	Date	Lecture / Lab Topic	Assignment / To submit
	01/06	Presentation, course <u>organization</u> and overview	
01	01/07	<b>Lab:</b> Individual <u>interviews</u> with professor	Book your appointment, be there.
	01/08	Environments, <u>systems</u> , and science(s)	Fill survey on Moodle
	01/13	<u>Scientific method</u> and quantitative approaches	
02	01/14	<b>Lab:</b> Models in Environmental Science and scientific inquiry	Submit your expert reading (ER) proposal
	01/15	<u>Energy</u> and matter	
	01/20	Natural <u>cycles</u> and complexity	Submit <b>Quiz 1</b> / ER1 presentation
03	01/21	<b>Lab:</b> Models of carbon cycle	Submit term project proposal
	01/22	The making of an <u>atmosphere</u>	ER2 presentation
	01/27	<u>Life</u> on Earth and beyond	ER3 presentation
04	01/28	<b>Lab:</b> Simulating life	
	01/29	Life sustaining systems and biocapacity	Submit <b>Quiz 2</b> / ER4 presentation
	02/03	Water, oceans and marine life	ER5 presentation
05	02/04	<b>Lab*:</b> Water field trip	
	02/05	Forests, grasslands and more	ER6 presentation
	02/10	Ecosystems and population dynamics	ER7 presentation
06	02/11	<b>Lab:</b> Population models	
	02/12	<b>Midterm</b>	Submit <b>Quiz 3</b> (Moodle)
<b>07</b>	<b>02/17</b>	<b>No classes this week. Enjoy the break</b>	
	02/24	Biodiversity and conservation	ER8 presentation
08	03/25	<b>Lab:</b> Determining biodiversity	
	02/26	Humans and the built environment	ER9 presentation

<b>Week</b>	<b>Date</b>	<b>Lecture / Lab Topic</b>	<b>Assignment / To submit</b>
	03/02	Ecosystem services and socio-ecological systems	ER10 presentation
09	03/03	<b>Lab*</b> : City field trip	
	03/04	Environmental ethics and governance	ER11 presentation
	03/09	Pollution and environmental risks	Submit <b>Quiz 4</b> / ER12 presentation
10	03/10	<b>Lab</b> : Warming model	ER13 presentation
	01/11	Global and climate change	ER14 presentation
	03/16	Life cycle assessment	ER15 presentation
11	03/17	<b>Lab</b> : Ecological footprint of our grocery and commute	ER16 presentation
	03/18	Food systems	ER17 presentation
	03/23	Waste	ER18 presentation
12	03/24	<b>Lab*</b> : The dump field trip	ER19 presentation
	03/25	Land-use change	ER20 presentation
13	03/30	Energy	Submit <b>Quiz 5</b> / ER21 presentation
	03/31	<b>Lab</b> : Project presentations	ER22 presentation
	04/01	Sustainability and SDG	ER23 presentation
	04/06	Art, science and solutions	
14	04/07	<b>Lab: Lab Exam</b>	
	04/08	Review and assessment	
	04/14	Final exam (exact date TBD)	
	04/20		

**\*Field trips are subject to confirmation\***

**\*\*\*See the weekly summaries on Moodle for full lists of required readings to be prepared for class.\*\*\***

## 8. Additional Course Policies

### ***Academic Integrity***

Do not cheat, plagiarize, or do other academic offenses. It is your responsibility to understand which activities constitute cheating and plagiarism. See:

<https://webapps-5.okanagan.bc.ca/ok/Calendar/AcademicIntegrity>

### ***Accessibility Services***

Any student who needs an accommodation should register with the Okanagan College Accessibility Services at [https://www.okanagan.bc.ca/Student\\_Services/students/accessibility-services.html](https://www.okanagan.bc.ca/Student_Services/students/accessibility-services.html)

## 9. Additional Information

### ***Time commitment***

This course should, on average, require 3-4 h of out-of-class independent work. Depending on your reading abilities it might require you less or more time. Please plan your timetable accordingly.

### ***Documents and submissions***

To reduce the environmental footprint of this course, electronic documents will be preferred. If you need printed copies of syllabus or course documents (i. e. Handouts), please talk to me and we will find a solution. Peer evaluations, assignments, quizzes, lab and project reports are all to be submitted using Moodle.

### ***Attribution***

This course is based on previous courses taught by Professors Todd Redding and Arthur “Gill” Green.

### ***Tips for success***

- Complete the readings before a new unit begins, and then review again after the unit is over.
- Be an active participant during lectures and labs.
- Ask questions - during class or office hours, or by email. Ask me, and your classmates. Use Moodle.
- Start your expert reading and project early and allow adequate time to complete them.
- Give yourself plenty of time to prepare a good cheat sheet for exams. This requires going through the material and taking the time to review the concepts that you're not comfortable with.
- Do not procrastinate - don't let a unit go by with unanswered questions as it will just make the following unit's material even more difficult to follow.

*I respectfully acknowledge that I live and work in the unceded and ancestral territory of the Syilx people.*

For more details go to: <https://www.syilx.org/about-us/syilx-nation/>