DURHAM COLLEGE
SUCCESS MATTERS

School of Science & Engineering Technology

Environmental Science

2019-2020 Academic Year

Program	Year	Semester
SET-Environmental Technology Advanced Diploma	1	1

Course Code:	ENVI 2131	**Course Equiv. Code(s):**	SCIE 1302
Course Hours:	56	**Course GPA Weighting:**	4
Prerequisite:	N/A		
Corequisite:	N/A		
Laptop Course:	**Yes** [ ] **No** [X]		
Delivery Mode(s):	**In class** [X] **Online** [ ] **Hybrid** [ ] **Correspondence** [ ]		
Authorized by (Dean or Director):	Michelle Hutt	**Date:**	August 2019

Prepared by		
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Course Description:

This one semester course (two hours lecture, two hours lab) introduces the fundamental principles of ecology and environmental science. It emphasizes an ecosystem approach to studying the environment. The interactions between abiotic and biotic are examined to gain an understanding of how a dynamic balance is achieved in natural ecosystems. This course also examines the effect of human intervention on ecosystems and biomes through an investigation of the five categories of pollution as well as the major trends in resource consumption and use. This is done to gain a better understanding of how the environment is altered by human action and why these actions may have significant effects on an ecosystem and its sustainability. The laboratory exercises are an integral part of this course. They are designed to both reinforce concepts developed during lectures as well as introduce new concepts. An emphasis is placed on terrestrial and aquatic ecosystems both through field and in class lab work.

Subject Eligibility for Prior Learning Assessment & Recognition (PLAR):

Prior Learning Assessment and Recognition (PLAR) is a process a student can use to gain college credit(s) for learning and skills acquired through previous life and work experiences. Candidates who successfully meet the course learning outcomes of a specific course may be granted credit based on the successful assessment of their prior learning. The type of assessment method (s) used will be determined by subject matter experts. Grades received for the PLAR challenge will be included in the calculation of a student's grade point average.

The PLAR application process is outlined in http://www.durhamcollege.ca/plar. Full-time and part-time students must adhere to all deadline dates. Please email: PLAR@durhamcollege.ca for details.

PLAR Eligibility

Yes [X] **No** [ ]

PLAR Assessment (if eligible):

- [X] Assignment
- [X] Exam
- [ ] Portfolio
- [ ] Other

Course Learning Outcomes

Course Learning Outcomes contribute to the achievement of Program Learning Outcomes for courses that lead to a credential (e.g. diploma). A complete list of Vocational/Program Learning Outcomes and Essential Employability Skill Outcomes are located in each Program Guide.

Course Specific Learning Outcomes (CLO)

Student receiving a credit for this course will have reliably demonstrated their ability to:

CLO1	Relate biological, chemical and physical sciences to environmental work.
CLO2	Characterize abiotic and biotic relationships for the purpose of analyzing ecosystems.
CLO3	Relate knowledge of biogeochemical cycles of various elements to ecosystem functioning and maintenance.
CLO4	Describe energy conservation measures, energy generation and alternative energy in terms of environmental impacts.
CLO5	Recognize the interrelationships among technology, politics, social issues and the economy.
CLO6	Differentiate natural and anthropogenic influences on ecosystem stability and development.
CLO7	Recognize the impact of environmentally damaging activities on ecosystems, renewable and non-renewable resources.
CLO8	Identify the pressures and challenges of sustainable development.
CLO9	Conduct field tests and investigations according to prescribed procedures, processes and standards.
CLO10	Prepare, interpret and analyze data using appropriate methods.

Essential Employability Skill Outcomes (ESSO)

This course will contribute to the achievement of the following Essential Employability Skills:

- [X] EES 1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
- [ ] EES 2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.
- [X] EES 3. Execute mathematical operations accurately.
- [ ] EES 4. Apply a systematic approach to solve problems.
- [X] EES 5. Use a variety of thinking skills to anticipate and solve problems.
- [ ] EES 6. Locate, select, organize, and document information using appropriate technology and information systems.
- [X] EES 7. Analyze, evaluate, and apply relevant information from a variety of sources.
- [X] EES 8. Show respect for the diverse opinions, values, belief systems, and contribution of others.
- [X] EES 9. Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.
- [X] EES 10. Manage the use of time and other resources to complete projects.
- [ ] EES 11. Take responsibility for one's own actions, decisions, and consequences.

Evaluation Criteria:

The Course Learning Outcomes and Essential Employability Skills Outcomes are evaluated by the following evaluation criterion.

Evaluation Description	Course Learning Outcomes	EESOs	Weighting
In-Process Activities and Homework (10 @ 1%)	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8	EES5, EES7	10
Laboratory Assignments (Labs 1-5 included in midterm mark)	CLO1, CLO2, CLO3, CLO5, CLO6, CLO9, CLO10	EES3, EES5, EES7, EES9	40
Term Test One (included in the midterm mark)	CLO1, CLO2, CLO3, CLO5, CLO6	EES1, EES8, EES10	15
Term Test Two	CLO1, CLO4, CLO6, CLO7, CLO8	EES1, EES10	15
Cumulative Final Test	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8	EES1, EES5, EES8, EES10	20
Total			**100%**

Notes:

1. The relative timing of the term tests are included in the section "Sequence of Instruction". The exact dates will be determined during the semester but students will have at least one week notice prior to the test date. The format for tests will be discussed in class when test dates are announced.
2. Content and concepts learned in the labs will be incorporated into the term tests.
3. All tests will be closed book.
4. The final test will be comprehensive (students will be evaluated on all material from the beginning to the end of the semester).
5. Assignments will only be accepted up to 5 days after the due date. For each day the assignment is late, 15% will be deducted. Weekends are included in the day count.
6. Any work that has been plagiarized will receive a mark of zero and an academic alert will be filed.

Required Text(s) and Supplies:

1. Smith, T. M. (2014). Elements of Ecology, First Canadian Edition, 1st Edition. Toronto. Pearson Canada Inc.

Recommended Resources (purchase is optional):

1. This course contains labs that will require you to be outdoors. Appropriate clothing and footwear is recommended.

Policies and Expectations for the Learning Environment:

General Policies and Expectations:

General College policies related to	General policies related to
+ Acceptable Use of Information Technology	+ attendance
+ Academic Policies	+ absence related to tests or assignment due dates
+ Academic Honesty	+ excused absences
+ Student Code of Conduct	+ writing tests and assignments
+ Students' Rights and Responsibilities can be found on-line at http://www.durhamcollege.ca/academicpolicies	+ classroom management can be found in the Program Guide (full time programs only) in MyCampus http://www.durhamcollege.ca/mycampus/

Course Specific Policies and Expectations:

Part A Absenteeism Policies
1. a) To reflect established practice in the workplace and demonstrate responsibility, students unable to be in attendance for an evaluation, are required to contact their professor within 24 hours of the scheduled evaluation time. Failure to communicate your absence to the instructor by email , will result in a mark of zero.
Students may be required to provide evidence that is reasonable with respect to the circumstances related to the missed evaluation
b) Students are responsible for all material provided during class time (assignments, handouts, deadlines, test dates and instruction), whether they are in attendance or not.
c) In order to avoid a grade mark of zero, students who unavoidably miss a lab must notify the professor via email, prior to the scheduled lab time or within 24 hours of missing the scheduled lab. Students may be required to provide evidence that is reasonable with respect to the circumstances related to the missed evaluation for a maximum of two lab periods or 20% of the total laboratory evaluation weight, whichever is less. If any additional lab periods are missed, a grade of zero will be entered for each. This policy is in place to ensure all practical learning outcomes are achievable.

Part B Laboratory Policies and Expectations
1 a) Online Safety Modules
All students must successfully pass the safety training provided On-Line through DC Connect (D2L). Completion of this training confirms the student understands and agrees to adhere to the safety regulations put forth.
Students will not be authorized to attend labs until this requirement is complete. Missed labs will result in a mark of 0.

b) Laboratory Attendance
Laboratory attendance is compulsory; there are no makeup laboratories
Students must attend in their scheduled lab section.
All laboratory periods begin at 10 minutes after the hour (as noted in your schedule) To ensure student safety, late entry to labs is not permitted. All missed labs will result in a mark of 0.
Students must be present and complete each laboratory activity, in order for a report to be accepted for grading.
c) It is highly recommended that students with special health conditions such as, but not limited to, pregnancy, allergies or asthma, speak with their lab instructors as soon as the semester begins and/or register with the ASC as soon as possible.
Please inform your laboratory instructor if you are required to wear medical devices
d) For the health and safety of all individuals, instruction and communication when working in the Lab must be in the English language only
e) Back packs, cellphones, headphones and ear buds are not permitted in the laboratories at any time.
f) To ensure safety of the lab space, students must commit themselves to working cooperatively, respectfully, and safely. Should a student not adhere to lab safety policies and procedures, the lab instructor will issue a student alert for conduct. Penalties will be commensurate with the nature of the offence.

General Course Outline Notes:

1. Students should use the course outline as a learning tool to guide their achievement of the learning outcomes for this course. Specific questions should be directed to their individual professor.
2. The college considers the electronic communication methods (i.e. DC Mail or DC Connect) as the primary channel of communication. Students should check the sources regularly for current course information.
3. Professors are responsible for following this outline and facilitating the learning as detailed in this outline.
4. Course outlines should be retained for future needs (i.e. university credits, transfer of credits etc.)
5. A full description of the Academic Appeals Process can be found at http://durhamcollege.ca/gradeappeal.
6. Faculty are committed to ensuring accessible learning for all students. Students who would like assistance with academic access and accommodations in accordance with the Ontario Human Rights Code should register with the Access and Support Centre (ASC). ASC is located in room SW116, Oshawa Campus and in room 180 at the Whitby Campus. Contact ASC at 905-721-3123 for more information.
7. Durham College is committed to the fundamental values of preserving academic integrity. Durham College and faculty members reserve the right to use electronic means to detect and help prevent plagiarism. Students agree that by taking this course all assignments could be subject to submission either by themselves or by the faculty member for a review of textual similarity to Turnitin.com. Further information about Turnitin can be found on the Turnitin.com Web site.

Learning Plan

The Learning Plan is a planning guideline. Actual delivery of content may vary with circumstances.

Students will be notified in writing of changes that involve the addition or deletion of learning outcomes or evaluations, prior to changes being implemented, as specified in the Course Outline Policy and Procedure at Durham College.

Wk.	**Hours:** 2 **Delivery:** In Class
1	**Course Learning Outcomes** CLO1, CLO5
	Essential Employability Skills **Taught:** EES5, EES8 **Practiced:** EES5, EES8, EES9
	Intended Learning Objectives UNIT 1 - INTRODUCTION After completing this unit, students will be able to: - distinguish between environmental science and ecology; - describe the basic assumptions underlying the anthropocentric, biocentric and ecocentric world views; - define sustainability and sustainable development and state the principles behind sustainability; - discuss how both science and value judgements are involved in the application of environmental science; - discuss the relationship between species and ecosystems - discuss the difference between resources and conditions
	Intended Learning Activities Ice Breaker Discussion and development of class learning environment Discussion of Course Outline and Program Learning Outcomes PP/lecture/discussion
	Resources and References Course Outline and Program Learning Outcomes Lecture Notes posted on DC Connect Reading - Textbook Chapter 1
	Evaluation

Wk.	Hours: 2 Delivery: Lab
1	**Course Learning Outcomes** CLO9
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives Lab Orientation
	Intended Learning Activities Discussion of upcoming labs, appropriate dress, required supplies
	Resources and References N/A
	Evaluation

Wk.	Hours: 2 Delivery: In Class
2	**Course Learning Outcomes** CLO1, CLO2, CLO3
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 2 - ECOSYSTEMS - STRUCTURE AND FUNCTION After completing this unit, students will be able to: - discuss abiotic and biotic factors and their dynamic interaction with organisms; - apply the law of thermodynamics in terms of energy flow through an ecosystem; - use diagrams to show the movement of energy through an ecosystem and relate this movement to decreasing biomass at higher trophic levels.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapter 2 pg 21 and 22 and Chapter 20 pg 428
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
2	**Course Learning Outcomes** CLO2, CLO6, CLO9, CLO10
	Essential Employability Skills **Taught:** EES1, EES7 **Practiced:** EES1, EES7, EES10
	Intended Learning Objectives Lab One: Structure of Ecosystems - Abiotic Factors
	Intended Learning Activities Conduct a qualitative examination of the characteristics of three ecosystems, with special emphasis on the abiotic components.
	Resources and References Lab document provided by professor Dress to be outside
	Evaluation

Wk.	Hours: 2 Delivery: In Class
3	**Course Learning Outcomes** CLO1, CLO2, CLO3
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 2 - ECOSYSTEMS - STRUCTURE AND FUNCTION - CONTINUED After completing this unit, students will be able to: - discuss abiotic and biotic factors and their dynamic interaction with organisms; - apply the law of thermodynamics in terms of energy flow through an ecosystem; - use diagrams to show the movement of energy through an ecosystem and relate this movement to decreasing biomass at higher trophic levels.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
3	**Course Learning Outcomes** CLO2, CLO9, CLO10
	Essential Employability Skills **Taught:** EES1, EES7 **Practiced:** EES1, EES7, EES9, EES10
	Intended Learning Objectives Lab Two: Structure of Ecosystems - Biotic Factors
	Intended Learning Activities Identify and catalogue local plant species, with a special focus on deciduous trees and herbaceous plants. The information gathered during this lab with be utilized in the Ecology course next year.
	Resources and References Lab document provided by professor. Dress to be outside. Bring a device with good quality camera to capture images of the plants.
	Evaluation **Weighting** Lab One: Structure of Ecosystems - Abiotic Factors 4

Wk.	Hours: 2 Delivery: In Class
4	**Course Learning Outcomes** CLO2, CLO6
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 3 - ECOSYSTEMS - STABILITY AND CHANGE After completing this unit, students will be able to: - explain the concept of a 'dynamic balance' in an ecosystem; - define and give examples of the factors involved in biotic potential and environmental resistance; - explain the principles of population growth and regulation (carrying capacity); - name, draw a graph of, and describe the causes and consequences of two fundamental population curves, and relate these curves to the human impact on natural ecosystems; - explain the role of biodiversity in balanced ecosystems; - explain natural selection and evolution at the ecosystem level; and - Explain the forces that limit natural selection and the consequences of species diversity.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapter 17 pg 363 to 367 and Chapter 10
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
4	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO10
	Essential Employability Skills **Taught:** EES1, EES10 **Practiced:** EES1, EES9, EES10
	Intended Learning Objectives Lab Three: Ecosystem Diagram
	Intended Learning Activities Select an ecosystem and graphically show all of the inputs and outputs that are associated with it.
	Resources and References Lab document provided by professor Bring equipment to draw with (pencil crayons, markers, rulers). Large paper will be supplied.
	Evaluation **Weighting** Lab Two: Structure of Ecosystems - Biotic Factors @ 4% 6 Lab Three: Ecosystem Diagram @ 2%

Wk.	Hours: 2 Delivery: In Class
5	**Course Learning Outcomes** CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 4 - HUMAN POPULATIONS After completing this unit, students will be able to: - contrast current population growth rates in developing countries with those in developed countries; - describe the impact that humans have on the environment and how that impact will vary with population size; - list and describe the consequences of population growth in developing countries; - give specific examples showing how affluence intensifies negative environmental impacts (P = PAT); - describe and contrast population profiles, fertility rates, and future population projections for developed and developing countries; and - List the factors that are most specifically related to declines in fertility rates and discuss how they are mutually interdependent.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapter 10
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
5	**Course Learning Outcomes** CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** EES5, EES8 **Practiced:** EES5, EES8
	Intended Learning Objectives Lab Four: Environmental Values
	Intended Learning Activities Review the film "Before the Flood"- in which a variety of world experts explore how humanity has arrived at the current convergence of environmental crises while exploring steps that people can take to avert global disaster.
	Resources and References Lab document provided by professor
	Evaluation **Weighting** Lab Four: Environmental Values 3
Wk.	**Hours:** 2 **Delivery:** In Class
6	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives REVIEW - UNITS 1 - 4 Test
	Intended Learning Activities Review
	Resources and References N/A
	Evaluation **Weighting** Term Test One 15

Wk.	Hours: 2 Delivery: Lab
6	**Course Learning Outcomes** CLO1, CLO3, CLO6, CLO9, CLO10
	Essential Employability Skills **Taught:** EES3, EES9, EES10 **Practiced:** EES3, EES9, EES10
	Intended Learning Objectives Lab Five: Aquatic Ecosystems
	Intended Learning Activities Field trip to the west side of the campus to conduct environmental tests on the west branch of the Oshawa Creek.
	Resources and References Lab document provided by professor Dress for the weather and to be in the creek. It is very likely that you will get wet and muddy during this class.
	Evaluation

Wk.	Hours: 2 Delivery: In Class
7	**Course Learning Outcomes** CLO1, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 5 - RENEWABLE AND NONRENEWABLE RESOURCES After completing this unit, students will be able to: - outline the differences between renewable and nonrenewable resources; - List the major classes of renewable resources and outline the character of each; - identify the ways in which renewable resources can be degraded by excessive harvesting or inappropriate management; - explain the Tragedy of the Commons and give examples of how it operates today; - discuss how appropriate management can increase the potential harvest of biological resources; - describe case studies of the degradation of potentially renewable resources and provide reasons for those damages; - describe how the major sources of energy used in the industrial countries have changed from 1800 to present; - describe the global and Canadian production of non-renewable natural resources; - discuss the reliance of industrialized economies on non renewable resources, and predict whether these essential sources of material and energy will be available into the foreseeable future; - outline five alternative energy sources available for use and the potential role of these in a sustainable economy; and - explain why a national sustainable energy policy is an environmental necessity.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapter 26
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
7	**Course Learning Outcomes** CLO6, CLO7, CLO8, CLO10
	Essential Employability Skills **Taught:** EES1, EES7, EES9, EES10 **Practiced:** EES1, EES7, EES9, EES10
	Intended Learning Objectives Lab Six: Effects Of Environmental Pressure On Species Distribution And Population Size
	Intended Learning Activities Compare environmental factors influencing the status of Great Lakes fish.
	Resources and References Lab document provided by professor
	Evaluation **Weighting** Lab Five: Aquatic Ecosystems @ 4% 7 Lab Six: Effects Of Environmental Pressure On Species Distribution And Population Size @ 3%

Wk.	Hours: 2 Delivery: In Class
8	**Course Learning Outcomes** CLO1, CLO3, CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 6 - WATER POLLUTION - EUTROPHICATION AND HAZARDOUS CHEMICALS After completing this unit, students will be able to: - define pollution and pollutants; - describe the four (4) major zones of life in a lake; - distinguish between an oligotrophic and eutophic lake; - explain eutrophication, giving all the steps in the change from an oligotrophic to a fully eutrophic condition; - contrast eutrophication in a body of water such as Lake Ontario with that occurring shallow ponds and lakes; - describe how soil sediments affect aquatic ecosystems; - identify the major sources of nutrients leading to eutrophication and discuss control strategies for each; - describe the effect of seasons on thermal stratification and oxygen concentration in northern temperate lakes; - describe wetlands and how they are destroyed and the natural values lost as the destruction takes place; - list and describe the four categories of pollutants in raw sewage; - describe the processes of primary, secondary and tertiary treatment of sewage; - describe the impediments to using sewage waste as a resource; - list and define four categories of hazardous chemicals; - define and contrast point source pollution verses non-point source pollution; - define bioaccumulation and biomagnification and describe how they pertain to the toxic risk of some hazardous chemicals; and - Discuss current and future trends in the management and disposal of hazardous chemical wastes.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapter 25
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab	
8	**Course Learning Outcomes** CLO5, CLO7, CLO10	
	Essential Employability Skills	
	Taught: EES1, EES3, EES5, EES7, EES9	**Practiced:** EES1, EES3, EES5, EES7, EES9
	Intended Learning Objectives Lab Seven: Waste Audit And Waste Reduction	
	Intended Learning Activities Develop a Waste Audit summary and a Waste Reduction Work Plan for the school	
	Resources and References Lab document provided by professor	
	Evaluation	

Wk.	Hours: 2 Delivery: In Class
9	**Course Learning Outcomes** CLO1, CLO3, CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 6 - WATER POLLUTION - EUTROPHICATION AND HAZARDOUS CHEMICALS - CONTINUED After completing this unit, students will be able to: - define pollution and pollutants; - describe the four (4) major zones of life in a lake; - distinguish between an oligotrophic and eutophic lake; - explain eutrophication, giving all the steps in the change from an oligotrophic to a fully eutrophic condition; - contrast eutrophication in a body of water such as Lake Ontario with that occurring shallow ponds and lakes; - describe how soil sediments affect aquatic ecosystems; - identify the major sources of nutrients leading to eutrophication and discuss control strategies for each; - describe the effect of seasons on thermal stratification and oxygen concentration in northern temperate lakes; - describe wetlands and how they are destroyed and the natural values lost as the destruction takes place; - list and describe the four categories of pollutants in raw sewage; - describe the processes of primary, secondary and tertiary treatment of sewage; - describe the impediments to using sewage waste as a resource; - list and define four categories of hazardous chemicals; - define and contrast point source pollution verses non-point source pollution; - define bioaccumulation and biomagnification and describe how they pertain to the toxic risk of some hazardous chemicals; and - Discuss current and future trends in the management and disposal of hazardous chemical wastes.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapter 25
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
9	**Course Learning Outcomes** CLO1, CLO9
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives Lab Eight: Drinking Water Testing
	Intended Learning Activities Conduct tests on drinking water for chlorine (free and total), and turbidity. Prepare a chain of custody and appropriate sample label for further analysis.
	Resources and References Lab document provided by professor Lab coat and safety glasses
	Evaluation **Weighting** Lab Seven: Waste Audit And Waste Reduction @ 4% 6% Lab Eight: Drinking Water Testing @ 2%

Wk.	Hours: 2 Delivery: In Class
10	**Course Learning Outcomes** CLO1, CLO3, CLO5, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 7 - AIR POLLUTION AND MAJOR ATMOSPHERIC CHANGES After completing this unit, students will be able to: - describe the natural cleansing processes that take place in air; - outline the major sources of emission of air pollutants associated with sulphur, nitrogen, particulate and hydrocarbons; - discuss steps that could be taken to improve air quality from both primary and secondary pollutants; - discuss the importance of air pollutants to human health; - describe the ecological damage from air pollution near Sudbury, ON; - discuss the two major acidic pollutants and describe the effects of acid deposition on aquatic and terrestrial ecosystems; - list the major strategies for controlling acid emissions and evaluate their effectiveness; - describe how the greenhouse gases maintain heat in the atmosphere; - list the greenhouse gases and evaluate their contribution to present and future global warming; - describe the most significant possible impacts of future global warming; - describe the stratospheric ozone shield, including how it is formed and broken down; and - Evaluate the political and economic steps being taken to protect the ozone shield.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapter 28
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
10	**Course Learning Outcomes** CLO1, CLO7, CLO9, CLO10
	Essential Employability Skills **Taught:** **Practiced:** EES1, EES3, EES7, EES9
	Intended Learning Objectives Lab Nine: Air Quality And Automobiles
	Intended Learning Activities Estimate the area impact of vehicles used by our college community and the contribution of vehicle based pollution from your region, province and country.
	Resources and References Lab document provided by professor Dress for the weather. Some data collection will occur outside.
	Evaluation

Wk.	Hours: 2 Delivery: In Class
11	**Course Learning Outcomes** CLO1, CLO4, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives REVIEW - Units 5-7 Test
	Intended Learning Activities Review
	Resources and References N/A
	Evaluation **Weighting** Term Test Two 15

Wk.	Hours: 2 Delivery: Lab	
11	**Course Learning Outcomes** CLO4, CLO7, CLO8	
	Essential Employability Skills **Taught:** **Practiced:** EES3, EES7	
	Intended Learning Objectives Lab Ten: Ecological Footprint	
	Intended Learning Activities See how your "footprint" relates to sustainability.	
	Resources and References Lab document provided by professor	
	Evaluation Lab Nine: Air Quality And Automobiles	**Weighting** 4

Wk.	Hours: 2 Delivery: In Class
12	**Course Learning Outcomes** CLO3, CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 8 - PRESERVATION OF SPECIES AND ECOSYSTEM MANAGEMENT After completing this unit, students will be able to: - describe the ecological risks and economic benefits of pesticides; - outline the concept of integrated pest management and discuss whether it is applicable to all pest management problems; - describe how clear-cutting affects biodiversity; - analyze the ways in which habitat conversion, fragmentation and simplification affect biodiversity; - identify the most important environmental effects of agriculture and describe the damage caused; - list the major kinds of urban pollution and describe their causes and the recent trends in Canadian cities; - compare the management of solid waste and sewage in Canadian cities; - discuss the essential elements of urban planning and how it has affected land use in Canada; - document the extent of biodiversity losses, both known and estimated; - explain how loss of habitat, pollution and species exploitation affect biodiversity; - understand how pollution control costs are generated and the magnitude of those costs; - trace the origins of cost-benefit analysis and explain how cost-benefit analysis addresses internal and external cost of pollution; - understand the most important benefits of environmental regulations; and - Outline the process of an environmental impact assessment by using recent Canadian examples.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapters as assigned
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
12	**Course Learning Outcomes** CLO2, CLO5, CLO7, CLO10
	Essential Employability Skills **Taught:** EES1 **Practiced:** EES1, EES7, EES10
	Intended Learning Objectives Lab Eleven: Life Cycle Assessment
	Intended Learning Activities Create a poster showing the full life cycle of a common consumer product, including inputs and outputs.
	Resources and References Lab document provided by professor An object to evaluate (this will be explained in class)
	Evaluation **Weighting** Lab Ten: Ecological Footprint 4

Wk.	Hours: 2 Delivery: In Class
13	**Course Learning Outcomes** CLO3, CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives UNIT 8 - PRESERVATION OF SPECIES AND ECOSYSTEM MANAGEMENT - CONTINUED After completing this unit, students will be able to: - describe the ecological risks and economic benefits of pesticides; - outline the concept of integrated pest management and discuss whether it is applicable to all pest management problems; - describe how clear-cutting affects biodiversity; - analyze the ways in which habitat conversion, fragmentation and simplification affect biodiversity; - identify the most important environmental effects of agriculture and describe the damage caused; - list the major kinds of urban pollution and describe their causes and the recent trends in Canadian cities; - compare the management of solid waste and sewage in Canadian cities; - discuss the essential elements of urban planning and how it has affected land use in Canada; - document the extent of biodiversity losses, both known and estimated; - explain how loss of habitat, pollution and species exploitation affect biodiversity; - understand how pollution control costs are generated and the magnitude of those costs; - trace the origins of cost-benefit analysis and explain how cost-benefit analysis addresses internal and external cost of pollution; - understand the most important benefits of environmental regulations; and - Outline the process of an environmental impact assessment by using recent Canadian examples.
	Intended Learning Activities PP/lecture/discussion
	Resources and References Notes posted on DC Connect Textbook Chapters as assigned
	Evaluation **Weighting** In-Process/Homework 1

Wk.	Hours: 2 Delivery: Lab
13	**Course Learning Outcomes** CLO5, CLO8
	Essential Employability Skills **Taught:** **Practiced:** EES8
	Intended Learning Objectives Lab Twelve: Public Awareness And Silent Spring
	Intended Learning Activities Review a documentary on Rachel Carson and her book, Silent Spring.
	Resources and References Lab document provided by professor
	Evaluation **Weighting** Lab Eleven: Life Cycle Assessment @ 4% 6 Lab Twelve: Public Awareness And Silent Spring @ 2%
Wk.	**Hours:** 2 **Delivery:** In Class
14	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives REVIEW - Units 1 - 8 Final Cumulative Test
	Intended Learning Activities Review
	Resources and References N/A
	Evaluation **Weighting** Final Test 20

Wk.	Hours: 2 Delivery: Lab
14	**Course Learning Outcomes**
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives Lab Clean Up
	Intended Learning Activities Lab Clean Up
	Resources and References N/A
	Evaluation