

Environmental Science

2024-25 Academic Year

Program Title	Ministry Title	Major	Year	Semester
SEIT-Environmental Technology	--	ENVT	1	1
SEIT-Environmental Technology (Co-op)	--	ENVC	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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Delivery Mode(s): In class <input checked="" type="checkbox"/> Online <input type="checkbox"/> Hybrid <input type="checkbox"/> Flexible <input type="checkbox"/> HyFlex <input type="checkbox"/>	
Remote proctoring required Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Authorized by (Dean or Director): Tania Clerac	Date: July 2024

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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 various 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.

Campus Closure Notice

In the event of a campus closure during which time classes cannot be conducted or attended in person, course delivery will be conducted remotely where possible. Should teaching and learning resume on campus, students may be organized into smaller groups for classroom delivery, in accordance with directions from public health authorities. In either situation, the learning plan sequence and/or evaluation methods may be adjusted to address topics requiring hands-on, practical learning activities.

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 No

PLAR Assessment (if eligible):

- Assignment
- 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:

- 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.
- EES 3. Execute mathematical operations accurately.
- EES 4. Apply a systematic approach to solve problems.
- 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.
- EES 7. Analyze, evaluate, and apply relevant information from a variety of sources.
- EES 8. Show respect for the diverse opinions, values, belief systems, and contribution of others.
- EES 9. Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.
- 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: In-Process Activities and Homework 10 @ 1%	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8	EES5, EES7	10
Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	CLO1, CLO2, CLO3, CLO5, CLO6, CLO9, CLO10	EES3, EES5, EES7, EES9	50
Test: Term Test One - included in the mid-term mark	CLO1, CLO2, CLO3, CLO5, CLO6	EES1, EES8, EES10	10
Test: Term Test Two	CLO1, CLO4, CLO6, CLO7, CLO8	EES1, EES10	10
Test: Cumulative Final Test	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8	EES1, EES5, EES8, EES10	20
Total			100%

Notes:

- Lecture: To reflect established practice in the workplace and demonstrate responsibility, students unable to attend an evaluation must contact their professor within 24 hours of the scheduled evaluation time, by email. Students may be required to provide reasonable evidence concerning the circumstances related to the missed evaluation. Failure to communicate your absence to the instructor by email will result in a mark of zero. Students who have missed a test and communicated with the professor within the appropriate time frame will write the test at an alternate time in the test centre.
- Laboratories: To avoid a grade mark of zero, students who unavoidably miss a lab must notify the professor via email, before the scheduled lab time or within 24 hours of missing the scheduled lab. Students may be required to provide reasonable evidence concerning the circumstances related to the missed evaluation for a maximum of one (1) lab period or 10% 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.
- Evaluations that occur in class cannot be made up or supplemented. Students missing an evaluation due to exceptional circumstances (and providing reasonable supporting documentation), should speak to their professor about how to address the missed marks.
- Students are responsible for all material provided during class time including but not limited to announced deadlines, test dates, and instructions, whether they are in attendance or not.
- Laboratory attendance is compulsory; there are no makeup laboratories.
- Students must attend their scheduled lab section.
- All laboratory periods begin 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 zero.
- Students must be present and complete each laboratory activity, in order for a report to be accepted for grading.
- Students must have their lab workbook data signed off by the instructor where appropriate, before leaving the laboratory.
- Late penalty for all submissions is 15% per day.

Required Text(s) and Supplies:

Recommended Resources (purchase is optional):

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

Policies and Expectations for the Learning Environment:

General Policies and Expectations:

General College policies related to	General policies related to
<ul style="list-style-type: none"> + Acceptable Use of Information Technology + Academic Policies + Academic Integrity + Standards for Student Conduct for all Learning Environments can be found at https://durhamcollege.ca/wp-content/uploads/Standards-of-Student-Conduct-for-all-Learning-Environments.pdf + Information about academic policies and procedures can be found on-line at https://durhamcollege.ca/about/governance/policies 	<ul style="list-style-type: none"> + attendance + absence related to tests or assignment due dates + excused absences + writing tests and assignments + classroom management can be found in the Program Guide (full time programs only) in MyDC https://durhamcollege.ca/mydc/

All students at Durham College have the responsibility to familiarize themselves with and abide by the college's Academic Integrity Policy. Students are expected to complete and submit their own work in an honest manner, in accordance with the policy. Durham College has zero tolerance for breaches of academic integrity. All suspected breaches of academic integrity will be investigated and documented following procedures outlined in the policy, and should a breach be confirmed, appropriate penalties will be levied. Breaches of academic integrity refer to a variety of practices including, but not limited to:

- copying another person's work;
- using unauthorized materials or resources during an evaluation;
- obtaining unauthorized copies of evaluations in advance;
- collaborating without permission;
- colluding or providing unauthorized assistance;
- falsifying academic documents or records;
- misrepresenting academic credentials;
- buying, selling, stealing, soliciting, exchanging or transacting materials or information for the purpose of academic gain;
- bribing or attempting to bribe personnel;
- impersonation;
- submitting the same work in more than one course without authorization;
- improper use of computer technology and the internet;
- depriving others of academic resources;
- misrepresenting reasons for special consideration of academic work;
- plagiarizing or failing to acknowledge ideas, data, graphics or other content without proper and full acknowledgement;
- any unauthorized use of generative or other artificial intelligence.

If you have questions or concerns about what constitutes appropriate academic conduct or research and citation methods, and what your responsibilities are towards academic integrity, please visit the Academic Integrity website on MyDC, reach out to Student Academic Learning Services (SALS), or speak with your professor or Student Advisor.

Course Specific Policies and Expectations:

Online Safety Modules

Before starting any work in any laboratory, all students must complete the safety training provided online through DC Connect. This includes a quiz where students are required to achieve a grade of 100% (multiple attempts are permitted) and a survey. Completing this training confirms the student understands and agrees to adhere to the safety regulations.

Students not completing this requirement will be denied access to the labs and will receive a mark of zero for the missed lab periods.

Students must bring their certificate of completion to be signed by their lab instructors to demonstrate completion of this training. The safety training certificate is valid for one academic year. Students will complete a different safety training module for each year of their program.

Health Conditions

Although it is the student's choice to inform lab professors of health conditions that may impact their ability to participate in a laboratory exercise, faculty strongly encourage students to do so. Reporting a condition to the lab professor will ensure that the professor can provide the student with information to help keep the student safe. This information will remain confidential.

An alternative activity may be provided by the instructor to ensure the course learning outcomes associated with the activity are covered.

Laboratory Expectations

Backpacks, cellphones, headphones, and earbuds are not permitted in the laboratories at any time.

To ensure the 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 an Academic Notice for conduct. Penalties will be commensurate with the nature of the offence.

Laboratory Safety Regulations

1. Supervision is required in all labs. Exceptions to this may be permitted in certain labs with professor approval.
2. Eating, drinking, and horseplay in the lab are not permitted. Do not bring food or drink containers into any of the labs.
3. Lab coats and safety glasses are required in all laboratories.
4. Always visually inspect Personal Protective Equipment (PPE) before use and ensure proper fit.
5. Approved safety glasses must be worn at all times in the laboratory. Prescription glasses do not provide sufficient coverage; therefore, you are required to wear over-the-glasses safety glasses.
6. Contact lens use is at the discretion of the student. Many chemicals if caught behind the lens will cause lasting damage. If you are unsure, do not wear contact lenses in the lab.
7. Students must wear shoes that enclose the whole foot; low-heeled shoes with non-slip soles are preferable. To avoid injury to the feet from items dropped or spilled, open-toed, open-heeled, perforated, mesh, or canvas shoes are not allowed. Sandals, flip-flops, or sandals with socks are not considered appropriate attire.
8. Students must wear long pants or skirts that completely cover their legs. Student's arms, main torso, legs, and feet are to be completely covered when you are in the laboratory. Cropped shirts, mesh shirts, pants with mesh inserts, and distressed pants with holes are not considered appropriate, safe attire for the lab.
9. Students are encouraged to have spare, clean laboratory-appropriate clothing in their lockers in the event of a spill or an emergency.
10. Lab coats and other PPE are not to be worn outside of the laboratory hall areas, as they may be a source of contamination. Outside of the laboratory hall areas refers to the hallways in front of A206, A209, A213, A240, A120, and I210 only. Do not wear your lab coat in any common areas of the college including but not limited to classrooms, locker areas, study areas, cafeterias, food or drink lineups, computer commons, SEIT main office, or the library.
11. Lab coats and goggles worn in the Microbiology lab, A206, must not leave this lab for any reason.
12. Do not write on or dye your lab coat. Lab coats are white to enable wearers and coworkers to be able to quickly see if a chemical or solution has been spilled on the coat.
13. Long hair and beards must be tied back in such a way as to avoid contamination and interference with laboratory equipment and specimens.
14. Adhere to the following procedure when handling acids and bases greater than 1M/1N/1%:
 - Acid/Base Gloves must cover the hands and wrists where skin may be exposed
 - Acids/Bases at this concentration level must be opened and dispensed only in the fume hood
 - Ensure the fume hood sash is set at the appropriate level, between the two markings on the side of the fume hood.Ensure that any exposed skin (face and neck) is covered by the fume hood.
- Once finished, remove gloves as instructed

- Clean, inspect, and return gloves to their storage locations.
15. Read the safety warning on reagent containers. Become familiar with the Safety Data Sheets for all chemicals you are using before your lab begins.
16. Use the fume hood for all chemicals/reactions producing offensive odours/or toxic fumes.
- Fume hoods are not an extension of the bench top. Do not use them like you would a desk or tabletop.
 - The sash must be lifted upwards and be kept between the two markings on the side to ensure proper ventilation.
 - Do not raise the fume hood fully as this is the improper way to use the hood.
 - When disposing of waste in a fume hood, ensure that any exposed skin including your face and neck is covered. The fume hood should be at the lowest possible position which enables safe disposal.
17. Report all spills, accidents, and injuries to the lab instructor immediately.
- If a chemical enters the eye, immediately use the eyewash and flush for a minimum of 15 minutes.
 - If a chemical is spilled on the skin, immediately wash with plenty of water.
 - If the instructor informs you that you are required to go into the safety shower, you must go. Your dignity will be protected and there will be dry clothing made available to you.
- The Lab instructor and student must jointly complete an online incident report form <http://www.durhamcollege.ca/forms/accidentinjury/> and forward as directed on the Lab Poster.
18. Use proper lab techniques and practices at all times:
- I. Care must be taken when using pipettes since they are very fragile and expensive. Use appropriate pipetting devices as shown by your instructor. Mouth pipetting of any substance is prohibited.
 - II. Do not use your mouth to propel any liquid out of burettes, pipettes, or any glassware
 - III. Once rinsed dispose of Pasteur pipettes or any glass item with a sharp edge in the broken glass container located in the lab or as directed by your instructor. Do not put these items in the regular garbage as they may cause a puncture and become a hazard to housekeeping staff.
 - IV. Waft fumes to nose rather than smelling directly.
 - V. Carry all strong acids and bases in an approved rubber container.
 - VI. Pour acid slowly into water. NEVER POUR WATER INTO CONCENTRATED ACID.
 - VII. Point the test tube away from yourself and others when carrying out a reaction.
 - VIII. When inserting anything glass into a rubber stopper, lubricate with water or glycerol; wrap your hand in the towel; apply gentle pressure with twisting motion, never use force.
 - IX. Larger volumetric flasks should never be held or carried by the neck, especially when filled. Support these large items with two hands.
 - X. Discard cracked or chipped glassware in the broken glassware box by following the broken glassware procedure located in each lab.
 - XI. Flammable liquids should never be used with an open flame in the lab.
 - XII. Extremely corrosive materials should be handled only while wearing gloves.
 - XIII. Pour or take only quantities of solvents as required for the experiment. Cap all solvent bottles after use. Use solvents in the fume hoods.
 - XIV. Label each container of material as you remove it from a reagent bottle according to SDS (WHMIS). Do not put extra removed material back into reagent bottles.
 - XV. Synthetic fingernails are not recommended in the laboratory; they are made of extremely flammable polymers, which can burn to completion and are not easily extinguished.
19. Pour or scoop out only quantities of reagents or chemicals as required by the experiment.
- Weigh quantities directly from containers and do not transfer excessive amounts to large-weigh boats.
 - Never use hands to transfer materials
 - Return lids to all containers immediately after use.
20. Clean up spills immediately using an appropriate method
- For acids use sodium bicarbonate
 - For bases use vinegar
 - For organics use absorbent
- Inform your instructor when there is a spill.
21. Clean up the balance immediately after use. Brushes are at each balance for this purpose.
22. Disposal of chemicals: When in doubt consult your lab instructor. Never mix chemicals unless specifically instructed to do so.
- Organic Compounds: In general, all liquid is to be placed in "Halogenated" or "Nonhalogenated" waste cans as appropriate.
- Inorganic Compounds: Follow specific instructions provided by your instructor.
- Acids and Bases: Dilute and neutralize strong acids and bases before disposal. Pour slowly into the sink in the fume hood, while water is running. Keep the water running for at least 5 minutes after you have disposed of the neutralized chemical. Never dispose of strong acids and bases together.
23. Any sample that needs to be stored must be appropriately labelled using the WHMIS labels

provided in the labs. The label must include contents and your name, and it also must be dated. These samples are then stored in a designated laboratory cabinet. Samples stored in laboratory glassware such as a volumetric, will be disposed of. Be sure that the chemical you are storing does not produce a toxic smell. If it does, please speak to your instructor about which fume hood you should be putting your sample into.

24. At the end of your lab period, your workstation should be left clean with all glassware cleaned and returned to the appropriate location. **NO BEAKERS ARE TO BE LEFT IN THE FUME HOODS OR IN LABORATORY DRAWERS.** Wash your hands before leaving the lab.

25. Special rules will apply to A206 for Microbiology and will be detailed by professors as needed. No material or equipment is to be removed from A206 without the professor's permission.

26. Students are not to remove any chemicals, solvents, equipment, or supplies from any laboratory without permission. If a student does, he/she may be asked to withdraw from the program.

27. Familiarize yourself with the location of fire extinguishers, fire blankets, emergency showers, eyewash stations, emergency gas shut-off, and evacuation routes in all your labs upon entry. If you have any questions about proper use, please ask your laboratory instructor.

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 <https://durhamcollege.ca/about/governance/policies/academic-policies> .
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.
8. In compliance with the Directive on the Costs of Educational Material under the Ministry of Training, Colleges and Universities Act (MTCU Act), please visit this link to determine textbook costs: <https://durham.bookware3000.ca/course-materials/textbook-search>. Please speak with your professor to determine if prior versions of a textbook are acceptable.

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.

Week/ Module	Hours:	2	Delivery:	In Class
1	Course Learning Outcomes			
	CLO1, CLO5			
	Essential Employability Skills			
	Taught:	EES5, EES8	Practiced:	EES5, EES8, EES9
	Intended Learning Objectives/Topics			
	UNIT 1 - INTRODUCTION			
	After completing this unit, students will be able to: <ul style="list-style-type: none"> - 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			
	Notes posted on DC Connect			
	Evaluation		Weighting	
	In Process: In-Process Activities and Homework 10 @ 1%		1	

Week/ Module	Hours:	2	Delivery:	Lab
1	Course Learning Outcomes	CLO9		
	Essential Employability Skills			
	Taught:	Practiced:		
	Intended Learning Objectives/Topics	Lab Orientation		
	Intended Learning Activities	Discussion of upcoming labs, appropriate dress, required supplies		
	Resources and References	N/A		
	Evaluation			
Week/ Module	Hours:	2	Delivery:	In Class
2	Course Learning Outcomes	CLO1, CLO2, CLO3		
	Essential Employability Skills			
	Taught:	Practiced:		
	Intended Learning Objectives/Topics	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		
	Evaluation	In Process: In-Process Activities and Homework 10 @ 1%		Weighting

Week/ Module	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/Topics				
	Lab 1: 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		Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark		Weighting 5	
Week/ Module	Hours:	2	Delivery:	In Class	
3	Course Learning Outcomes				
	CLO1, CLO2, CLO3				
	Essential Employability Skills				
	Taught:		Practiced:		
	Intended Learning Objectives/Topics				
	UNIT 2 - ECOSYSTEMS - STRUCTURE AND FUNCTION - CONTINUED				
	After completing this unit, students will be able to: <ul style="list-style-type: none"> - 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		In Process: In-Process Activities and Homework 10 @ 1%		Weighting 1	

Week/ Module	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/Topics Lab 2: 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 will be utilized in the Ecology course next year.	
	Resources and References Lab document provided by professor. Independent work in your local park. Dress appropriately Bring a device with good quality camera to capture images of the plants.	
Evaluation Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 5	

Week/ Module	Hours:	2	Delivery:	In Class
4	Course Learning Outcomes			
	CLO2, CLO6			
	Essential Employability Skills			
	Taught:		Practiced:	
	Intended Learning Objectives/Topics			
	UNIT 3 - ECOSYSTEMS - STABILITY AND CHANGE			
	After completing this unit, students will be able to: <ul style="list-style-type: none"> - 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				
Evaluation			Weighting	
In Process: In-Process Activities and Homework 10 @ 1%			1	
Week/ Module	Hours:	2	Delivery:	Lab
4	Course Learning Outcomes			
	CLO5, CLO10			
	Essential Employability Skills			
	Taught:		Practiced:	
			EES1	
	Intended Learning Objectives/Topics			
	Lab 3: Program Standard Investigation			
	Intended Learning Activities			
Using the Program Standard, research what your future may look like.				
Resources and References				
Lab document provided by professor Program Standard				
Evaluation			Weighting	
Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark			3	

Week/ Module	Hours: 2	Delivery: In Class
5	Course Learning Outcomes CLO5, CLO6, CLO7, CLO8	
	Essential Employability Skills	
	Taught:	Practiced:
	Intended Learning Objectives/Topics 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	
	Evaluation In Process: In-Process Activities and Homework 10 @ 1%	Weighting 1

Week/ Module	Hours: 2	Delivery: Lab
5	Course Learning Outcomes CLO5, CLO6, CLO7, CLO8	
	Essential Employability Skills	
	Taught: EES5, EES8	Practiced: EES5, EES8
	Intended Learning Objectives/Topics Lab 4: 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 Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 3.5
Week/ Module	Hours: 2	Delivery: In Class
6	Course Learning Outcomes CLO1, CLO2, CLO3, CLO5, CLO6	
	Essential Employability Skills	
	Taught:	Practiced:
	Intended Learning Objectives/Topics REVIEW - UNITS 1 - 4 Test	
	Intended Learning Activities Review	
	Resources and References N/A	
	Evaluation Test: Term Test One - included in the mid-term mark	Weighting 10

Week/ Module	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/Topics Lab 5: 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.	
	Evaluation Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 4

Week/ Module	Hours:	2	Delivery:	In Class
7	Course Learning Outcomes			
	CLO1, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8			
	Essential Employability Skills			
	Taught:		Practiced:	
	Intended Learning Objectives/Topics			
	UNIT 5 - RENEWABLE AND NON-RENEWABLE RESOURCES After completing this unit, students will be able to: <ul style="list-style-type: none"> - 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				
Evaluation			Weighting	
In Process: In-Process Activities and Homework 10 @ 1%			1	

Week/ Module	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/Topics Lab 6: 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 Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 3

Week/ Module	Hours: 2	Delivery: In Class		
8	Course Learning Outcomes CLO1, CLO3, CLO5, CLO6, CLO7, CLO8			
Essential Employability Skills				
<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Taught:</td> <td style="width: 50%;">Practiced:</td> </tr> </table>			Taught:	Practiced:
Taught:	Practiced:			
Intended Learning Objectives/Topics UNIT 6 - WATER POLLUTION - EUTROPHICATION AND HAZARDOUS CHEMICALS After completing this unit, students will be able to: <ul style="list-style-type: none"> - define pollution and pollutants; - describe the four (4) major zones of life in a lake; - distinguish between an oligotrophic and eutrophic 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				
Evaluation In Process: In-Process Activities and Homework 10 @ 1%		Weighting 1		

Week/ Module	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/Topics Lab 7: 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 Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 5

Week/ Module	Hours: 2	Delivery: In Class		
9	Course Learning Outcomes CLO1, CLO3, CLO5, CLO6, CLO7, CLO8			
Essential Employability Skills				
<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Taught:</td> <td style="width: 50%;">Practiced:</td> </tr> </table>			Taught:	Practiced:
Taught:	Practiced:			
Intended Learning Objectives/Topics UNIT 6 - WATER POLLUTION - EUTROPHICATION AND HAZARDOUS CHEMICALS - CONTINUED After completing this unit, students will be able to: <ul style="list-style-type: none"> - define pollution and pollutants; - describe the four (4) major zones of life in a lake; - distinguish between an oligotrophic and eutrophic 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				
Evaluation In Process: In-Process Activities and Homework 10 @ 1%		Weighting 1		

Week/ Module	Hours:	Delivery:
	2	Lab
9	Course Learning Outcomes CLO1, CLO9	
	Essential Employability Skills	
	Taught:	Practiced:
	Intended Learning Objectives/Topics Lab 8: 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 Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 4

Week/ Module	Hours:	Delivery:
	2	In Class
10	Course Learning Outcomes CLO1, CLO3, CLO5, CLO7, CLO8	
	Essential Employability Skills	
	Taught:	Practiced:
	Intended Learning Objectives/Topics UNIT 7 - AIR POLLUTION AND MAJOR ATMOSPHERIC CHANGES After completing this unit, students will be able to: <ul style="list-style-type: none"> - 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	
	Evaluation In Process: In-Process Activities and Homework 10 @ 1%	Weighting 1

Week/ Module	Hours:	2	Delivery:	Lab
10	Course Learning Outcomes CLO1, CLO7, CLO9, CLO10			
	Essential Employability Skills			
	Taught:		Practiced: EES1, EES3, EES7, EES9	
	Intended Learning Objectives/Topics Lab 9: 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. You will be required to gather data from family, friends and neighbours to complete this lab.			
	Evaluation Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark			Weighting 5
Week/ Module	Hours:	2	Delivery:	In Class
11	Course Learning Outcomes CLO1, CLO4, CLO6, CLO7, CLO8			
	Essential Employability Skills			
	Taught:		Practiced:	
	Intended Learning Objectives/Topics REVIEW - Units 5-7 Test			
	Intended Learning Activities Review			
	Resources and References N/A			
	Evaluation Test: Term Test Two			Weighting 10

Week/ Module	Hours:	Delivery:
	2	Lab
11	Course Learning Outcomes CLO4, CLO7, CLO8	
	Essential Employability Skills	
	Taught:	Practiced: EES3, EES7
	Intended Learning Objectives/Topics Lab 10: Ecological Footprint	
	Intended Learning Activities See how your "footprint" relates to sustainability.	
	Resources and References Lab document provided by professor	
	Evaluation Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 4

Week/ Module	Hours:	2	Delivery:	In Class
12	Course Learning Outcomes			
	CLO3, CLO5, CLO6, CLO7, CLO8			
	Essential Employability Skills			
	Taught:		Practiced:	
	Intended Learning Objectives/Topics			
	UNIT 8 - PRESERVATION OF SPECIES AND ECOSYSTEM MANAGEMENT After completing this unit, students will be able to: <ul style="list-style-type: none"> - 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				
Evaluation		Weighting		
In Process: In-Process Activities and Homework 10 @ 1%		1		

Week/ Module	Hours: 2	Delivery: Lab
12	Course Learning Outcomes CLO2, CLO5, CLO7, CLO10	
	Essential Employability Skills	
	Taught: EES1	Practiced: EES1, EES7, EES10
	Intended Learning Objectives/Topics Lab 11: Life-Cycle Assessment	
	Intended Learning Activities Create a poster/document/powerpoint 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 Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark	Weighting 5

Week/ Module	Hours:	2	Delivery:	In Class
13	Course Learning Outcomes			
	CLO3, CLO5, CLO6, CLO7, CLO8			
	Essential Employability Skills			
	Taught:		Practiced:	
	Intended Learning Objectives/Topics			
	<p>UNIT 8 - PRESERVATION OF SPECIES AND ECOSYSTEM MANAGEMENT - CONTINUED</p> <p>After completing this unit, students will be able to:</p> <ul style="list-style-type: none"> - 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				
Evaluation				

Week/ Module	Hours:	2	Delivery:	Lab	
13	Course Learning Outcomes				
	CLO5, CLO8				
	Essential Employability Skills				
	Taught:		Practiced:		EES8
	Intended Learning Objectives/Topics				
	Lab 12: 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	
Assignment: 12 Laboratory Assignments - Labs 1-5 included in the mid-term mark				3.5	
Week/ Module	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/Topics				
	REVIEW - Units 1 - 8				
	Intended Learning Activities				
Review					
Resources and References					
N/A					
Evaluation					

Week/ Module	Hours: 2	Delivery: Lab
14	Course Learning Outcomes CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8	
	Essential Employability Skills	
	Taught:	Practiced:
	Intended Learning Objectives/Topics Final Cumulative Test	
	Intended Learning Activities Final Cumulative Test	
	Resources and References N/A	
	Evaluation Test: Cumulative Final Test	Weighting 20