

## COURSE SYLLABUS

COURSE TITLE: **BIOL 102.1 NATURE FOR ENGINEERING**

COURSE CODE:		TERM:	Fall 2023
COURSE CREDITS:	1.0	DELIVERY:	Lecture & Tutorial
COURSE SECTION:	01	START DATE:	<b>TUESDAY SEPT 5, 2023</b>
LECTURE LOCATION:	PHYS 107	TUTORIAL LOCATION:	ENG 2C01
LECTURE TIME:	1:00 to 2:20 pm Tuesday and Thursday	TUTORIAL TIMES:	8:30 to 11:20am Tuesday, Wednesday, Thursday
WEBSITE:	Canvas		

### Course Description

Human activity is altering environments and biodiversity with profound effects on ecosystems. This course will explore foundational principles of ecology and the causes, consequences and solutions to questions about anthropogenic changes in biodiversity and ecosystems.

**Note:** Restricted to students in the College of Engineering.

### Learning Outcomes

By the end of the course, you are expected to

1. recall core principles and fundamental terminology associated with ecology, biodiversity and ecosystems
2. explain food-web structure and energy flow within an ecosystem, and their relevance to environmental engineering at local and global scales
3. articulate how engineers can better incorporate an understanding of biodiversity and ecosystems in their professional practice in order to minimize environmental impacts to species and human quality of life
4. apply scientific methods and evidence to understand biodiversity and ecosystems
5. work effectively within small groups to investigate multifaceted problems
6. demonstrate proficiency in disseminating your findings through writing and speech

### Course Overview

The goal of this course is to provide an opportunity for first-year students in the College of Engineering to gain a basic understanding of the science of ecology, appreciate the impacts of human activity on biodiversity and ecosystems at local, regional and global scales, and see the positive role the engineering profession can play in mitigating the negative effects of these activities. The course is scheduled for three weeks and consists of six lectures (75 minutes each) delivered on Tuesday and Thursday afternoons. In week 2 and 3, there is an opportunity for students to apply their knowledge during 3-hour tutorials. The tutorials involve interactive

group work to study real world problems. All instructors for the course are drawn from the Department of Biology and have a particular enthusiasm for the science of ecology. By the end of the course, we anticipate that students will be able to provide scientifically sound answers to the questions posed in the Lecture Topics listed below. Your course instructors will use their expertise, experience and enthusiasm to help you gain knowledge to answer these questions.

## Instructor

Lecture: Malin Hansen                      malin.hansen2020@gmail.com

**Office Hours**                      Please email to set up a meeting or speak to me after lecture.

## Land Acknowledgement

At the University of Saskatchewan, we acknowledge we are on Treaty Six Territory and the Homeland of the Métis. We pay our respect to the First Nation and Métis ancestors of this place and reaffirm our relationship with one another.

## Learning Charter

The University of Saskatchewan Learning Charter is intended to define aspirations about the learning experience that the University aims to provide, and the roles to be played in realizing these aspirations by students, instructors and the institution. Information about the Learning Charter can be found at: <https://teaching.usask.ca/about/policies/learning-charter.php>

## Learning and Teaching Context

We are very excited to be offering this course in person this term. However, we realize that this is a time of transition for all of us. For some of you this will be the first time learning in person at the university and for others it will have been many months since you were here on campus. In addition, the past year and a half has been very difficult, with trauma, isolation and loss experienced by many in our communities. We recognize that this means that going back to school may be challenging for many of us. Please be mindful of each other, be patient and interact with empathy and care. The university has developed the guidelines below to help guide us through this term safely.

## Important Guidelines for this Term

During this term it is important that we undertake in-person elements of this class safely. In order to do this the university has developed a set of expectations and safety protocols that all students must adhere to if they are to engage in in-person activity.

### Throughout the term:

**Protect the pack:** Right now, the impact of student choices and activities when not on campus cannot be separated from time spent on campus. In order to “protect the pack”, the university is asking all students who are doing in-person work to be mindful and do whatever possible to lower the risk that you will contract COVID-19 and bring it onto campus.

**Know what is required and expected of you:** One of the critical lessons learned in dealing with COVID-19 is knowing that situations can change and we must be flexible and ready to adjust our safety protocols. Instead of listing all of the relevant information in your course outline, the university has created [a webpage](#) where all up-to-date information around returning to campus is listed. **You are responsible** for **regularly** checking the health and safety guidelines <https://covid19.usask.ca/about/safety.php#Expectations> and knowing what is expected of you throughout the fall term.

**Follow all guidance:** Students are expected to follow all guidance provided by the University's Pandemic Recovery/Response Team (PRT), College/Department, professors, lab instructors, TAs, and any other staff member involved in the in-person academic program activities (e.g., Protective Services, Safety Resources).

**Key channels of communication:** If there is a need for the class to pause meeting in-person for a period of time you will be notified. If this occurs, you will be provided with detailed information on what you will need to do in place of the in-person class sessions (e.g., read content posted in Canvas, complete learning activities in Canvas).

All learning materials for this course will be posted in Canvas and class announcements/emails will also be sent out regularly. **Please make sure to check your emails and Canvas several times a week!**

## Course Schedule

Date	Lecture Topics
<b>Week One</b>	
Tuesday	Introduction to BIOL 102. Why study Biology? Introduction to DNA and genes.
Thursday	Genetic modification of organisms (genetic engineering and genome editing)  <b>NO TUTORIAL</b>
<b>Week Two</b>	
Tuesday	Introduction to ecosystems and ecosystem services. Can we construct a biosphere?
Thursday	Estimating the value of ecosystem services.

	<b>TUTORIAL (8:30-11:20am Tuesday, Wednesday, OR Thursday)</b> Genetic engineering and evaluation of scientific information.
<b>Week Three</b>	
Tuesday	Biomimicry. Using nature as inspiration.
Thursday	Bioremediation. Microbes that eat waste. <b>TUTORIAL (8:30-11:20am Tuesday, Wednesday, OR Thursday)</b> Ecosystem services and land use simulations.

## Tutorials

The tutorials will utilize case-based scenarios and require students to work in small groups (maximum four students). The cases will involve data analysis, graph interpretation, conclusions and decision making. Though students will work in small groups each student will be required to hand in an individual report at the end of each tutorial. The report will be submitted via the course Canvas. The hand-in folder will close at the end of the tutorial. Reports cannot be submitted after that time.

**Tutorial #1:** The first tutorial will be on genetic engineering and evaluation of scientific information.

**Tutorial #2:** The second tutorial will be on ecosystem services and land use planning. This tutorial includes the use a simulation and evaluation of different land use scenarios.

## Required Resources

There is no specific textbook for this course. Students can use the following online textbook to support for their learning:

Clark, M. A., Douglas, M., & Hoi, J. (2018). *Biology 2e*. Houston, Texas : OpenStax, <https://openstax.org/books/biology-2e/pages/1-introduction>

We may also post links to websites and articles on Canvas.

## Course Website & Supplementary Resources

Your instructors may make supplementary material available to you through the course website. This material will not replace the lecture experience and you are encouraged to attend all lectures and take your own notes.

## Portable Electronic Device Required

The lecture and tutorial of this course will require the use of a laptop computer or tablet. Each student is responsible for bringing a laptop or tablet to all classes.

## Grading & Assessment Scheme

Grade Component	%	Due
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Report (individual) from tutorial #1	30	At the end of tutorial #1
Report (individual) from tutorial #2	30	At the end of tutorial #2
Lecture exit papers (short essays) 6 in total (4% each)	24	At the end of each lecture
End of block assignment	12	11:59pm of the last Thursday
Participation marks	4	During each lecture
Total	100%	

## Evaluation of Student Performance

### Reports from tutorials

**Value:** 60% of final course grade (30% for each report)

**Due Date:** At the end of each tutorial.

**Format:** Electronic worksheets with short and long discussion questions. Students will work in small groups during tutorials, but reports are to be handed in individually.

### Exit papers

**Value:** 24% of final course grade (4% each)

**Due Date:** At the end of each lecture.

**Format:** Students will be asked to write a reflection during 5-10 minutes at the end of each lecture. Examples of questions to reflect on are: What did you learn today that you did not know previously? What did you find most interesting in today's lecture? What would you like to learn more about? Do you have any questions that you want answered? In what ways do you think today's topic relates to your engineering degree?

### End of block assignment

**Value:** 12% of final course grade

**Due Date:** 11:59pm of the last Friday.

**Format:** Your instructor will present more information about this assignment during week1.

### Participation marks

**Value:** 4% of final course grade

**Date:** During each lecture.

**Format:** In class questions and discussions.

## Feedback to Students

The assignments and reports will be graded by teaching assistants who will also watch for plagiarism. Reports will be graded and returned on a schedule such that students will have feedback about their work before they need to submit their second report. Grades will be assigned based on the quality of the written report, including clarity and logic of the writing. The full grading rubric will be posted on the course website. During the lab periods, students are

encouraged to interact with their Teaching Assistants. However, working with other students in the group to find answers will be encouraged.

## Attendance & Participation Expectations

Attendance at tutorial periods is required. Absence from a tutorial will result in an assignment of zero. Students who are ill on the day of the lab or who experience extenuating personal circumstances that require them to miss a tutorial must contact the course instructor (an email or phone call is adequate) prior to the tutorial and explain the reason why the lab is being missed. There are no exceptions to this policy; students who fail to proactively advise the instructor that they will miss the tutorial will be subject to the penalty noted above. Depending on the situation, additional documentation may be requested from the student. Grades associated with the work that is missed will be transferred to other components of the course. The components to receive extra weighting in these situations will be chosen at the sole discretion of the instructor.

The anticipation is that the tutorials will be lively with conversations focused on the lab activities. Students who leave before the end of the lab period or those who spend extensive time during the tutorial on activities unrelated to the tutorial will do less well in the course. It is expected that students will adequately prepare for the tutorials. This includes reading any preparatory material posted on blackboard by the instructors.

When a student is unable to attend both of the tutorials due to illness or personal circumstance, it is assumed that student will have also missed the lectures delivered in those weeks. This means that the student has been unable to attend a significant component of the course. The student will be referred to the Engineering Student Centre for advice on how to proceed with the rest of the course.

## Late Assignments and Make up tutorials

Reports are due at the end of each tutorial. These must be submitted via the course website no later than the end of the tutorial. Late reports will not be accepted. This means that groups must work efficiently during the lab period to complete the assignment each day.

**Make Up tutorial:** If a student misses one tutorial for an excusable reason: illness/ bereavement/ official university business, he/she may be able to make up the tutorial. Please contact the instructor as soon as possible to arrange for this.

**Top up:** A student who submits all assessments and tutorial reports, but has a failing grade in the course (below 50%) may be permitted to write a top up at the end of the term (Dec 19<sup>th</sup>, 2022). A passing performance on the top up will result in an overall grade of 50% for the course, i.e. the top up is a last chance to pass the course, but a grade above 50% cannot be achieved by writing it. Note that only 1 top up can be written between PHYS152, CHEM142, GEOL102 and BIOL102. If a student is failing more than one of these courses at the end of the term, he/she may select one course for which to write the top up, but would have to repeat the other courses in a subsequent year.

## Recording of the Course

Students are not allowed to record any aspect of this course, except with the permission of the instructor or as provided for by arrangements with AES. Any recording made under AES provisions is to only be used for the personal learning of the student who made the recording.

## Copyright

Course materials are provided to students based on their registration in a class. Any material created by course instructors is the intellectual property of the instructors. This includes exams, PowerPoint/PDF slides and other course notes. Additionally, other copyright-protected materials created by textbook publishers and authors may be provided to students based on license terms and educational exceptions in the Canadian Copyright Act (see <http://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>).

Before copying or distributing others' copyright-protected materials, students need to ensure that their use of the materials is covered under the University's Fair Dealing Copyright Guidelines available at <http://www.usask.ca/copyright/basics/copyright-policy/fair-dealing-guidelines/index.php>. For example, posting others' copyright-protected materials on the internet is not covered under the University's Fair Dealing Copyright Guidelines; doing so requires permission from the copyright holder. For more information about copyright, please visit <http://www.usask.ca/copyright/students/rights/index.php> or contact the University's Copyright Coordinator at [copyright.coordinator@usask.ca](mailto:copyright.coordinator@usask.ca).

Students should be aware that a violation of the university's copyright policies could be an instance of non-academic misconduct. For example, the practice of uploading or posting copyright-protected materials to course-sharing websites, depositories, or "drop boxes", without the permission of the copyright holder, could result in a charge of non-academic misconduct under the university's "Standard of Student Conduct in Non-Academic Matters" (see Student Conduct section below).

## Student Feedback

The Department of Biology or the course instructors may survey students regarding the course. This is generally done through an in-class assessment near the end of the course.

## University of Saskatchewan Grading System

The University has established a grading system to be used in all of its courses. Information on literal descriptors for grading at the University of Saskatchewan (reproduced below) can be found at: <http://students.usask.ca/academics/grading/grading-system.php>

**Exceptional (90-100)** A superior performance with consistent evidence of

- a comprehensive, incisive grasp of the subject matter;
- an ability to make insightful critical evaluation of the material given;
- an exceptional capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently.

**Excellent (80-90)** An excellent performance with strong evidence of

- a comprehensive grasp of the subject matter;
- an ability to make sound critical evaluation of the material given;
- a very good capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently.

**Good (70-79)** A good performance with evidence of

- a substantial knowledge of the subject matter;
- a good understanding of the relevant issues and a good familiarity with the relevant literature and techniques;
- some capacity for original, creative and/or logical thinking;



- a good ability to organize, to analyze and to examine the subject material in a critical and constructive manner.

**Satisfactory (60-69)** A generally satisfactory and intellectually adequate performance with evidence of

- an acceptable basic grasp of the subject material;
- a fair understanding of the relevant issues;
- a general familiarity with the relevant literature and techniques;
- an ability to develop solutions to moderately difficult problems related to the subject material;
- a moderate ability to examine the material in a critical and analytical manner.

**Minimal Pass (50-59)** A barely acceptable performance with evidence of

- a familiarity with the subject material;
- some evidence that analytical skills have been developed;
- some understanding of relevant issues;
- some familiarity with the relevant literature and techniques;
- attempts to solve moderately difficult problems related to the subject material and to examine the material in a critical and analytical manner which are only partially successful.

**Failure <50** An unacceptable performance

For information regarding appeals of final grades or other academic matters, please visit the Student Conduct and Appeals section of the University Secretary's webpages:

<https://secretariat.usask.ca/student-conduct-appeals/appeals-in-academic-matters.php>

## Student Conduct

### Integrity Defined

The University of Saskatchewan is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals section of the University Secretary webpages (see below) and avoid any behavior that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

More information on what academic integrity means for students is found in the Academic Integrity webpages hosted by the University of Saskatchewan Library:

<https://library.usask.ca/academic-integrity.php>

### Code of Ethics For Engineers

Ethical behaviour is an important part of engineering practice. Each professional engineering association has a Code of Ethics, which its members are expected to follow. Since students are in the process of becoming Professional Engineers, it is expected that students will conduct themselves in an ethical manner.

The APEGS (Association of Professional Engineers and Geoscientists of Saskatchewan) Code of Ethics states that engineers shall "conduct themselves with fairness, courtesy and good faith towards clients, colleagues, employees and others; give credit where it is due and accept, as well as give, honest and fair professional criticism" (Section 20(e), The Engineering and Geoscience Professions Regulatory Bylaws, 1997).

The first part of this statement discusses an engineer's relationships with his or her colleagues. One of the ways in which engineering students can demonstrate courtesy to their colleagues is by helping to maintain an atmosphere that is conducive to learning, and minimizing disruptions in class. This includes arriving on time for lectures, turning cell phones and other electronic devices off during lectures, not leaving or entering the class at inopportune times, and refraining from talking to others while the instructor is talking.



## **Policies on Academic Dishonesty, Academic Appeals and Course Delivery**

Students are expected to undertake all aspects of their academic work in an ethical manner. Students are expected to submit their own individual work for academic credit, properly cite the work of others, and to follow all rules for examinations. Academic misconduct, plagiarism, and cheating will not be tolerated. Students are responsible for understanding the university's policies on academic integrity and academic misconduct. If any form of academic misconduct is discovered, appropriate disciplinary action will be taken.

Information about expectations and policies about student conduct at the University of Saskatchewan can be found at The Office of the University Secretary webpage. This webpage contains links to several important documents including the Student Discipline Policy, Student Academic Misconduct Regulations, Standard of Student Conduct in Non-Academic Matters, and Procedures for Student Appeals in Academic Matters (see weblinks below).

### **About Student Conduct:**

<https://secretariat.usask.ca/student-conduct-appeals/index.php>

### **Appeals in Academic Matters:**

<https://secretariat.usask.ca/student-conduct-appeals/appeals-in-academic-matters.php>

### **Academic Misconduct:**

<https://secretariat.usask.ca/student-conduct-appeals/academic-misconduct.php>

### **Non-Academic Misconduct:**

<https://secretariat.usask.ca/student-conduct-appeals/non-academic-misconduct.php>

A summary of University of Saskatchewan policies relating to academic courses is provided in the document: Academic Courses Policy on Class Delivery, Examinations, and Assessment of Student Learning <https://policies.usask.ca/policies/academic-affairs/academic-courses.php>

### **Safety:**

Safety is of paramount importance in the College. Students are expected to work in a safe and responsible manner, to follow all safety instructions, and use any specified personal protective equipment. Students failing to behave in a safe manner will be asked to leave.

## **Student Supports**

### **Support Services for Engineering Students**

- Engineering Student Centre (Rm. 2A05 Engineering Building)
  - Email: [esc@usask.ca](mailto:esc@usask.ca); Phone: 306-966-5274;  
[https://engineering.usask.ca/contact\\_info/esc-office.php](https://engineering.usask.ca/contact_info/esc-office.php)
- Student Wellness Centre (3rd & 4th Floors, Place Riel):  
<https://students.usask.ca/health/>
- Financial Services: <https://students.usask.ca/money/>

### **Student Learning Services**

Student Learning Services (SLS) offers assistance to U of S undergrad and graduate students. For information on specific services, please see the SLS web site:

<https://library.usask.ca/studentlearning/>

### **Teaching, Learning and Student Experience**

The Teaching, Learning and Student Experience Unit (TLSE) focuses on providing developmental and support services and programs to students and the university community.

For more information, see <https://teaching.usask.ca/about/people/vice-provost-teaching-learning-and-student-experience.php>

**Access and Equity Services (AES)**

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with AES if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals. In order to access AES programs and supports, students must follow AES policy and procedures. For more information, check [www.students.usask.ca/aes](http://www.students.usask.ca/aes), or contact AES at 306-966-7273 or [aes@usask.ca](mailto:aes@usask.ca). They are located in Rm. E1, Administrative Building.