COURSE SYLLABUS

COURSE TITLE:	**An Introduction to Ecology and Ecosystems**		
COURSE CODE:	82262	**TERM:**	Fall 2024
COURSE CREDITS:	3	**DELIVERY:**	Lecture & Practicum (Lab)
CLASS SECTION:	01	**START DATE:**	September 4, 2024
CLASS LOCATION:	Physics 107 (IN PERSON)	**LAB LOCATION:**	Arts 140 (IN PERSON)
CLASS TIME:	MWF 9:30 – 10:20 am	**LAB TIME:**	L1 Mon. 1:30-5:20 pm L2 Tues. 1:30-5:20 pm L3 Wed. 1:30-5:20 pm
WEBSITE:	via Canvas		

Instructors

Philip McLoughlin	Professor and Course Coordinator philip.mcloughlin@usask.ca http://mcloughlinlab.ca/lab
Scott Halpin	Lab Coordinator scott.halpin@usask.ca

Office Hours: Appointments for remote meetings can be set up with instructors by email. Responses to specific questions about course material are at the discretion of each instructor. Further information about individual policies may be provided in the lecture or laboratory by each instructor.

Course Description

An introduction to ecological principles and the functioning of aquatic and terrestrial ecosystems. Community structure and dynamics, ecosystem production, populations, energy flow and material recycling will be considered.

Other Details: This course is designed for undergraduate students that have an interest in broadening their studies in biology; however, we encourage students from a variety of departments to take this course because the principles of ecology cross several disciplines within the Colleges of Arts and Science, Agriculture, and Veterinary Medicine. Major topics include: an introduction to ecological principles and the functioning of aquatic and terrestrial ecosystems; individual-based ecology including behavior; population dynamics; community structure and dynamics; ecosystem production; energy flow and material recycling; and conservation biology.

Prerequisites: BIOL 121 or GEOG 120 or 6 credit units in GEOL. Students with credit for BIOL 253 or PLSC 213 will not receive credit for BIOL 228.

Learning Outcomes

By the completion of this course, students will be expected to:

- Develop an introductory understanding of ecology. This understanding will be in four major ecological sub-disciplines and scales of ecology: individual, population, community, ecosystem, and global ecology, with emphasis on ecology in our changing environment.
- Be able to describe how the scientific method and Indigenous knowledge systems can be applied in examples of ecological studies;
- Be able to describe mechanisms contributing to biological diversity at the individual, population, community, landscape, and global scales;
- Understanding hypotheses and testing of hypotheses;
- Practice and apply skills by compiling, summarizing and interpreting basic scientific data;
- Build critical thinking skills through the process of evaluating scientific information in Biol 228 laboratories and from the literature.
- Become familiar with the impacts of humans on ecological systems in our changing environment.
- Develop a sense of place by acquiring new knowledge about the ecology of populations, communities and ecosystems of Saskatchewan and Canada.

Information on literal descriptors for grading at the University of Saskatchewan can be found at the end of this document, and at:
https://students.usask.ca/academics/grading/grading-system.php

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. A copy of the Learning Charter can be found at: https://teaching.usask.ca/about/policies/learning-charter.php

Schedule

The course lecture component consists of a series of IN-PERSON lectures and exams, including an in-person written midterm exam and an in-person written final exam. The first 75% of the course focuses on individual-level, population ecology, and community ecology; the latter 25% emphasizes ecosystem and global ecology; however, the linkages between scales and the influence of environmental change on ecology is emphasized throughout the course. Instructor PowerPoint slides and/or learning notes will be posted before the start of each scheduled class time, as much as possible. **LECTURES ARE IN-PERSON AND WILL NOT BE RECORDED TO ENCOURAGE IN-CLASS PARTICIPATION**, with some possible allowances for recording at the discretion of your instructor. The textbook is a critical resource for the course (and lab manual). Any suggested readings, videos or other supplementary materials provided in advance; these will be posted in Canvas. Questions concerning lecture content may be posed through Canvas or by email.

The laboratory component of the class includes a series of exercises to compliment the lecture material. Collection of ecological data, statistical analysis of ecological data, population growth models, diversity measures, communities, energy flow, and biomass distributions will all be examined. **NOTE THAT DUE TO THE NATURE OF ECOLOGICAL WORK, SOME EXPERIENTIAL LEARNING WILL BE CONDUCTED OUTDOORS EARLY IN THE SEMESTER, INCLUDING FIELD TRIPS DURING LAB HOURS AND A COLLEGE-APPROVED FIELD TRIP ON SATURDAY, SEPTEMBER 21.**

Lecture Schedule (2024)

Days	Module Topics	Applicable Textbook Chapter Readings*
Sept. 4	Syllabus Overview	
Sept. 6, 9	Introduction to Ecology and Ecology in a Changing World; Ecology as a Science; Indigenous Ecological Knowledge	Ch. 1 (all) Ch. 2: 2.1 (remaining sections of Ch. 2 useful for lab)
Sept. 11–18	Individual-level Ecology, Introduction to Trade-offs, Behavioural Ecology, Habitat Selection and Optimal Foraging; Introduction to the Niche	Ch. 5: 5.1–5.3, 5.6
Sept. 20–27	Population-level Ecology, Obtaining and Characterizing Population Data; Introduction to Population Growth and Density Dependence; Trade-offs in Life History; Metapopulations **(No Class Sept. 30: National Day for Truth and Reconciliation)**	Ch. 6 (all): Ch. 12: 12.3–12.4

Oct. 2–9	Competition	Ch 7; 7.1–7.3, 7.5
Oct. 11–23	Exploitation (Predation, Herbivory, Parasitism), with a note on Allee Effects; Apparent Competition **(No Class Oct 14: Thanksgiving Day)**	Ch. 8 (all)
Oct. 25	**BIOL 228 Mid-Term Exam (written in class, 50 mins)**	
Oct. 28–30	Mutualism and Facilitation; Game Theory	Ch. 9: 9.1–9.3, 9.5; also Fig. 9.12 and associated text
Nov. 1–8	Multi-species Interactions and Food Webs; Trophic Cascades; Indirect Interactions	Ch. 10 (all)
Nov. 11–15	**(No Classes: Reading Week)**	
Nov. 18–22	Patterns of Biodiversity in Space and Time	Ch. 11: 11.1, 11.5–11.6; Ch. 12: 12.5–12.6; Ch. 13: 13.3; also Fig. 13.31 and associated text
Nov. 25–29	Nutrient Cycling and Ecosystem Services	Ch. 14 (all)
Dec. 2, 4	Humans and Our Role in the Environment; Global Change Biology; Reconciliation Ecology	Ch. 15 (all)
TBA	**Final Exam (TBA)**	

*Readings will be supplemented on occasion with short articles or excerpts.

General Laboratory Schedule (2024)

Week of (OR DAY OF)	Lab/Location	Assignment Type	Date Available	Date Due	Grade Value (approx.)
Sept 9	South Saskatchewan Riverbank Field Trip (meet first Rm 140 Arts)	1) Component of On-line post-lab quiz 1 (X/10) Open book, two attempts, no time limit	MON., Sept 30	Sat., Nov 30	
Sept 16	Kernen Prairie Field Trip (meet first Rm 140 Arts)	1) Component of On-line post-lab quiz 1 (X/10) Open book, two attempts, no time limit 2) Data collection (X/15)	MON., Sept 30 In lab	Sat., Nov 30 In lab	 1.9%

Sept 21 **SATURDAY** 8:30 to 3:30	Beaver Creek (Main doors CSRB 112 Science Place)	1) Component of On-line post-lab quiz 1 (X/10) Open book, one attempts, no time limit 2) Attendance (X/15)	MON., Sept 30 Sat., Sept 21	Sat., Nov 30 Sat., Sept 21	1.6% 1.9%
Sept 23	Pike Lake Field Trip (Rm 140 Arts)	1) Component of On-line post-lab quiz 1 (X/10) Open book, one attempt, no time limit	MON., Sept 30	Sat., Nov 30	
Sept 30	Population Growth	1) Component of On-line post-lab quiz 2 (X/5) Open book, one attempt, no time limit 2) Population Growth Sample Problem (X/25) 3) Population Growth Graph	Wed., Oct 9 In lab In lab	Sat., Nov 30 In lab In lab	 3.2% 0.6%
Oct 7	Life Tables (Rm 140 Arts)	1) Component of On-line post-lab quiz 2 (X/5) Open book, one attempt, no time limit 2) Life Table Sample Problem (X/15)	Wed., Oct 9 In lab	Sat., Nov 30 In lab	0.8% 1.9%
Oct 14	No Labs	No Labs - Thanksgiving			
Oct 21	Sampling Methods (Rm 140 Arts)	1) Component of On-line post-lab quiz 3 (X/5) Open book, one attempt, no time limit 2) In-lab exercise (X/25) 3) QUIZ 1 On Field Trips, Labs 1,2,3 & Beaver Creek	Wed., Oct 30 In lab In lab	Sat., Nov 30 In lab In lab	 3.2% 5%
Oct 28	Chi-Square Analysis (Rm 140 Arts)	1) Component of On-line post-lab quiz 3 (X/5) Open book, one attempt, no time limit 2) In lab exercise (X/25)	Wed., Oct 30 In lab	Sat., Nov 30 In lab	0.8% 3.2%
Nov 4	Terrestrial Energy Flow (Rm 140 Arts)	1) Component of On-line post-lab quiz 4 (X/5) Open book, one attempt, no time limit 2) In lab exercise (X/20) 3) QUIZ 2 On Population Growth/ Life tables/Sampling labs (labs 4,5, 6)	Wed., Nov 20 In lab In lab	Sun., Nov 30 In lab In lab	0.8% 2.6% 5%
Nov 11		No Lab Reading Week			
Nov 18	Aquatic Energy Flow (Rm 140 Arts)	1) Component of On-line post-lab quiz 4 (X/5) Open book, one attempt, no time limit 2) In lab exercise (X/20)	Wed., Nov 20 Wed., Nov 17	Sat., Nov 30 Wed., Nov 17	0.8% 2.6%
Nov 25	Review				
Dec 2	QUIZ 3	1) QUIZ 3 On X^2 and Energy Flow labs (labs 7, 8 & 9)	In lab	In lab	5%

Course Resources

Students are required to read the course syllabus.

Required (Assigned) Textbook

Marchetti, M.P., Lockwood, J.L., and Hoopes, M.F. 2023. Ecology in a Changing World. 1st Edition. W.W. Norton & Company, Inc., New York.

The textbook is available as a hard copy and as an e-pub. Note: This is a new textbook for the course, which updates from previous texts used in the class, which are now out of print and somewhat dated. Further, this new textbook is required reading, not just recommended (the course is being re-visioned using the new textbook).

Lab Manual

The lab manual will be available for download through the purchase of an access code from the bookstore. The lab manual will be available on or before the first full week of September. Because of major changes to the lab to accommodate past (mixed) delivery strategies, used (old) lab manuals will not work. Each student must purchase the electronic version (2024).

Course Website

Instructors WILL NOT TYPICALLY record lectures and make them available on the Biol 228 course page of Canvas, except under some circumstances. Rules regarding copyright apply to these recordings, if posted: recordings are only intended for the use of students registered in this class.

Your instructor will provide a copy of their lecture notes/slides on Canvas to you as a courtesy. You are not required to download or print these slides/notes, but it is highly recommended that you review these slides as part of your studying for exams. While instructors will endeavour to have the notes posted sometime in advance of the lectures this is not guaranteed.

Recommended Technology for Remote Learning

Students are reminded of the importance of having the appropriate technology for in person but also remote learning, should circumstances require this. The list of recommendations can be found at https://students.usask.ca/study/get-prepared.php. Both the lecture component and laboratory portion of this course will require a working knowledge of computers and various computer programs, the Canvas portal for remote delivery of classes, and, for the lab, basic software including MS Excel and Word. Computers will be used extensively to collect and analyze data and prepare reports in the laboratory. You will need to access your University computer account during the laboratory; make sure you know your university NSID and password and how to log on to your account. Further details are in the lab manual.

Supplementary Resources

From time to time, your instructors may make supplementary material available to you. Supplementary materials will also be placed on the Biol 228 course page of Canvas. This material will not replace the lecture or lab experience and you are encouraged to attend all lectures and take your own notes. A number of paper-based resources for the laboratory may be placed on reserve for you in the Natural Sciences Library; information about these is provided in the lab manual as appropriate.

Grading Scheme

Mid-term exam	20%
Final exam	40%
Laboratory component	40%
Total	100%

Midterm and Final Examination Scheduling

Midterm and final examinations must be written on the date scheduled. Final examinations may be scheduled at any time during the examination period which extends from December 9 to 24; students should therefore avoid making prior travel, employment, or other commitments for this period. If a student is unable to write an exam through no fault of his or her own for medical or other valid reasons, documentation must be provided **WITHIN THREE WORKING DAYS** and an opportunity to write the missed exam may be given. Students are encouraged to review all examination policies and procedures at https://students.usask.ca/academics/exams.php. **Please note, final exams are rescheduled ONLY with a fee and by application to your College, following University-approved procedures.**

Evaluation Components (Lecture)

Students are encouraged to review all examination policies and procedures:
http://students.usask.ca/academics/exams.php

Midterm Exam

Value: 20% of final grade
Date: October 25th
Length: 50 minutes
Type: Multiple choice exam, in-person written. **Scientific calculators are required**

Final Exam

Value: 40% of final grade
Date: Consult Final Exam Schedule
Length: 3 hours
Type: Multiple choice exam, in-person written.
(calculators are not required for the final exam)

Evaluation Components (Laboratory)

The practical laboratory (lab) component is a critical component of the course and evaluated materials comprise 40% of your total grade. The lab schedule assigns quizzes and assignments on a weekly basis, with varying due dates (see General Laboratory Schedule). Consult your Lab Manual for details on each lab, the learning outcomes, and assessment.

Late laboratory assignments will be assigned a penalty of 10% per day after the due date, with acceptance of an assessment up to 5 days late.

Attendance Expectations and Criteria That Must Be Met to Pass

All students are expected to attend all lectures and labs. Attendance in laboratories is mandatory, with excused absence from the laboratory for approved reasons allowable only as explained in the laboratory manual.

Accommodations to miss the college-approved field trip on Saturday, Sept 21st, will be done on a case-by-case basis in consultation with the lab coordinator. Make up arrangements will be arranged based on mutual agreement of student and instructor. Graded component value will be spread across future assignments. You are not required to complete or pass all components of the lab to pass the course.

An overall course grade of 50% must be obtained to pass this course. Exams do not need to be passed to complete the course; however, all students must write the final exam to pass this course. Failure to write the final exam will result in a grade entry of Incomplete Fail.

University of Saskatchewan Grading System (for undergraduate courses)

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

Generative Artificial Intelligence (GenAI) and Learning Assessments

We wish to assess what you can do only with specific use of GenAI and other similar forms assistance. We have permitted some uses to support your learning. in general, we cannot police the use of GenAI in your assessments, but please recognize that if you use GenAI beyond reasonable:

- you will not get the practice you need;
- the feedback you get will not be meaningful;
- GenAi can guide you in the wrong direction for specific lab-related questions that are unique to the Biol 228 course; and
- your grade may not reflect what you can do within the expectations.

In Biol 228, particularly with respect to the lab, some limited and specific use(s) of GenAI is acceptable. See the following list of acceptable uses of GenAI, which should be

Sample uses with supporting rationale	
○ Generate ideas (refrain from relying on GenAI)	For the purposes of planning content multiple resources exist. Web searches and Google Scholar search engines inherently use GenAI based on keywords. Please also use course materials, library resources, instructors, and qualified peers to support your process, but refrain from allowing GenAI sites like ChatGPT to do the heavy lifting for you, as it only serves to circumvent the discovery phase for your own research.
○ Identify relevant information to further research (questions posed to GenAI could be useful)	
○ Improve format of what student has produced (GenAI to improve your writing can be useful).	For the purposes of finalizing content multiple resources exist. You may use software, library resources, instructors, qualified peers, and GenAI to support your writing process. Asking GenAI sites like ChatGPT to reduce a passage for wordcount, or correct for spelling and grammar, is a reasonable use of GenAI in modern academia.
○ Support final edits (GenAI can be useful).	

Copyright

Course materials are provided to you based on your registration in a class, and anything created by your professors and instructors is their intellectual property and cannot be shared without written permission. If materials are designated as open education resources (with a creative commons license) you can share and/or use in alignment with the CC license. 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 you 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 you copy or distribute others' copyright-protected materials, please ensure that your use of the materials is covered under the University's Fair Dealing Copyright Guidelines available at https://library.usask.ca/copyright/general-information/fair-dealing-guidelines.php. For example, posting others' copyright-protected materials on the open web is not covered under the University's Fair Dealing Copyright Guidelines, and doing so requires permission from the copyright holder.

For more information about copyright, please visit https://library.usask.ca/copyright/index.phpwhere there is information for students available at https://library.usask.ca/copyright/students/rights.php, or contact the University's Copyright Coordinator at copyright.coordinator@usask.ca or 306-966-8817.

Student Feedback

Students are encouraged to E-mail the instructor to review their performance anytime during the course by appointment.

Academic Integrity

The University of Saskatchewan is committed to the highest standards of academic integrity (https://academic-integrity.usask.ca/). Academic misconduct is a serious matter and can result in grade penalties, suspension, and expulsion.

Prepare for Integrity
Students are expected to act with academic integrity.

- Students are encouraged to complete the Academic Integrity Tutorial to understand the fundamental values of academic integrity and how to be a responsible scholar and member of the USask community (tutorial link: https://libguides.usask.ca/AcademicIntegrityTutorial).
- Students can access campus resources that support development of study skills, time and stress management, and ethical writing practices important for maintaining academic integrity and avoiding academic misconduct.

Responses to Misconduct
Students are expected to be familiar with the academic misconduct regulations (https://governance.usask.ca/student-conduct-appeals/academic-misconduct.php#About).

- Definitions appear in Section II of the academic misconduct regulations.
- The academic misconduct regulations apply regardless of type of assessment or presence of supervision during assessment completion.
- Students are advised to ask for clarification as to the specific expectations and rules for assessments in all of their courses.
- Students are urged to avoid any behaviour that could result in suspicions of cheating, plagiarism, misrepresentation of facts. Students should note that posting copyrighted course materials (e.g., notes, questions, assignments or exams) to third party websites or services or other forum or media without permission is an academic or non-academic misconduct offense.

Non-academic offenses are dealt with under the Standard of Student Conduct in NonAcademic Matters and Regulations and Procedures for Resolution of Complaints and Appeals.

Important Note: *Additional information about student misconduct specific to Biol 228 can be found in the laboratory manual. Biol 228 students are required to read and understand the information about misconduct that is presented in the laboratory manual.*

Note: A few components of this course will be done online. Although learning in a remote context is different, the rules and principles governing academic integrity remain the same. If you ever have questions about what may or may not be permitted, ask your instructor. Students have found it especially important to clarify rules related to quizzes administered remotely and to follow these carefully and completely.

Examinations with Access and Equity Services (AES)

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Access and Equity Services (AES) if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals at any time. Those students who are registered with AES with mental health disabilities and who anticipate that they may have responses to certain course materials or topics, should discuss course content with their instructors prior to course add / drop dates. In order to access AES programs and supports, students

must follow AES policy and procedures. For more information or advice, visit https://students.usask.ca/health/centres/access-equity-services.php, or contact AES at 306-966-7273 or aes@usask.ca.

Students registered with AES may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through AES by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by AES.

Student Supports

Academic Help for Students
The University Library offers a range of learning and academic support to assist USask undergrad and graduate students. For information on specific services, please see the Learning page on the Library web site https://library.usask.ca/support/learning.php

Teaching, Learning and Student Experience
Teaching, Learning and Student Experience (TLSE) provides developmental and support services and programs to students and the university community. For more information, see the students' web site https://students.usask.ca.

Financial Support
Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact Student Central (https://students.usask.ca/student-central.php).

Indigenous Students
The Gordon Oakes Red Bear Student Centre is dedicated to supporting the personal, social, cultural, and academic success of Métis, First Nations and Inuit students. Students are encouraged to visit https://students.usask.ca/indigenous/index.php to learn more.

International Student and Study Abroad Centre
The International Student and Study Abroad Centre (ISSAC) supports student success and facilitates international education experiences at USask and abroad. ISSAC is here to assist all international undergraduate, graduate, exchange and English as a Second Language students in their transition to the University of Saskatchewan and to life in Canada. ISSAC offers advising and support on matters that affect international students and their families and on matters related to studying abroad as University of Saskatchewan students. Please visit https://students.usask.ca/international/ for more information.

College Supports
Students in Arts & Science are encouraged to contact the Undergraduate Student Office and/or the Trish Monture Centre for Success with any questions on how to choose a major; understand program requirements; choose courses; develop strategies to improve grades; understand university policies and procedures; overcome personal barriers; initiate pre-career inquiries; and identify career planning resources. Undergraduate Student Office Contact: Room 265, Arts Building (306) 966-4231, student-advice@artsandscience.usask.ca

Treaty and Land Acknowledgement

As we engage in Remote Teaching and Learning, I would like to acknowledge that the Saskatoon campus of the University of Saskatchewan is 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. I would also like to recognize that some may be attending this course from other traditional Indigenous lands. I ask that you take a moment to make your own Land Acknowledgement to the peoples of those lands. In doing so, we are actively participating in reconciliation as we navigate our time in this course, learning and supporting each other.