UNIVERSITY OF SASKATCHEWAN

COURSE SYLLABUS

BIOL 121: DIVERSITY OF LIFE

COURSE CODE: 22165

CLASS SECTION: 01

TERM: Winter 2025

COURSE CREDITS: 3.0

DELIVERY: Lecture & Lab

LECTURE LOCATION: Health Sciences Building 1150

LECTURE TIME: Mon, Wed and Fri 12:30-1:20pm

LECTURE START DATE: January 6, 2025 **LECTURE END DATE**: April 4, 2025

LAB LOCATION: 1022 Education Building

LAB TIME: Check your lab schedule

LAB START DATE: Week of January 13, 2025 **LAB END DATE**: Week of March 24, 2025

Course Description

Our world has at least 15 million species, all of which have adapted to particular environments and lifestyles and use energy to grow and reproduce. We examine these processes in representative organisms from all the major groups, and discuss factors influencing changes in biodiversity over time and space.

Prerequisites

Prerequisite(s): Biology 30 or BIOL 90 or BIOL 107 or BIOL 108.
Note: Students with credit for BIOL 110 will not receive credit for BIOL 121.

Course Overview
This course is designed to introduce you to the vast and exciting field of biology, with a focus on biological diversity, evolution, adaptations of organisms to specific environments, and the evolutionary and ecological factors influencing changes in biodiversity over time and space.

Treaty 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.

Instructor and Lab Coordinator

Course instructor: Dr. Malin Hansen
E-mail: Malin.Hansen@usask.ca
Office location: Collaborative Science Research Building room 220.2 (call 306-966-4437 as the lab area is locked)
Office hours: Wednesdays 1:30-2:30pm and Thursdays 11:00am-12:00pm or email to set up a meeting.

Lab coordinator: Mr. Joel Yurach
Office location room 1021 Education Building
E-mail: joel.yurach@usask.ca

Joel Yurach is responsible for coordinating all aspects of the laboratories for BIOL 121. Your lab group will also be assigned one or more Teaching Assistants (TAs) who will help you during the lab periods. TAs work under the supervision of Joel Yurach and are senior undergraduate or graduate students.

Course Learning Outcomes
By the completion of this course, students will be able to:

1. **Evaluate** the requirements for life and use these requirements to speculate about the likelihood of life on other planets.
2. **Evaluate** the characteristics of life and identify characteristics that are unique to living organisms.
3. Use phylogenetic trees to **analyze** different approaches to classify organisms.
4. **Explain** different mechanisms of evolution such as natural selection, sexual selection, and genetic drift.
5. **Evaluate** the difference between microevolution and macroevolution and explain different mechanisms that may lead to speciation.
6. **Compare and contrast** concepts such as, unicellular and multicellular organisms, heterotrophs and autotrophs, chemotrophs and phototrophs, divergent and convergent evolution, homologous and analogous structures, and sexual and asexual reproduction.
7. **Evaluate** the significance of major biological events such as the oxygenation of the atmosphere, evolution of eukaryotes, evolution of multicellularity, evolution of sexual reproduction, and adaptations to life on land (in both plants and animals).
8. **Explain** how the drivers of species diversity vary with scale, i.e. global, regional/landscape and community.
9. **Analyze** the effect of important threats to biodiversity such as habitat loss, overharvesting, invasive species, pollution and climate change.

10. **Propose** strategies for conserving biological diversity, considering ecological, geographical, and anthropogenic factors.

See Canvas for Topic-Specific Learning Outcomes.

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

Required Resources

Lab Manual: Biology 121.3 Laboratory Manual (2023-2024 Edition) – **This is required for all labs.**

Textbook: We will use a FREE OPEN SOURCE textbook for this course: *Biology 2e*: Access via this link: Free Biology 2e Textbook Available for Download - OpenStax You can also purchase a paper copy from the USASK bookstore.

The pre-class reading assignments will be based on this textbook.

Laboratory Class information

1. **Labs begin the week of January 13**. **Make sure you have registered for a lab section.** Students are expected to attend and be on time for all scheduled labs, review labs and the final lab exam. Students are advised to consult the lab manual for further information about BIOL 121 procedures to follow when they are too ill to attend the lab period (and/or lab exam) or are facing extenuating personal circumstances.

2. **The current edition of the BIOL 121.3 lab manual is required for all labs** (this item can be purchased at the Bookstore in Marquis Hall). For your labs you should also bring standard items like pens, pencils, erasers, and a ruler.

3. Any other questions regarding the lab should be directed by e-mail to **Joel Yurach**.

Class and Lab Schedule

Date	Lecture Topics	Lab Activities (see Lab schedule in Lab Canvas for assignment details)
January 6, 8, 10	• Introduction to BIOL 121 • What is Biology? What is Life? • Characteristics and requirements for life	**NO LAB**

	• Classification of organisms • Phylogeny and the Tree of Life	
January 13, 15, 17	• Classification of organisms • Phylogeny and the Tree of Life	LAB 1 - Introduction & Prokaryotes
January 20, 22, 24	• Prebiotic Earth and the Origin of Life • Evolution and Classification of Prokaryotes	LAB 2 – Protists
January 27, 29, 31	• The first Eukaryotes • Evolution, classification and adaptations of protists.	LAB 3 – Fungi
February 3, 5, 7	• Evolution, classification and adaptations of fungi and plants	LAB 4 – Plants I - Green algae, mosses, ferns & club mosses
February 10, 12, 14	• Evolution, classification and adaptations of animals	LAB 5 – Plants II - Conifers & angiosperms
February 17-21	**MIDTERM BREAK**	
February 24, 26, 28	• Evolution, classification and adaptations of animals • Review **MIDTERM (12%)** **Wednesday February 26 at 6:30-7:20pm** • The scientific method • History of evolution	**NO LAB**
March 3, 5, 7	• Natural selection and microevolution • Additional mechanisms of evolution	Lab 6 - Animals I - Sponges, Cnidarians, Flatworms & Nematodes Lab 7 - Animals II - Segmented worms, Mollusks & Arthropods
March 10, 12, 14	• Evidence of evolution • Macroevolution • Mechanisms of speciation	Lab 8 - Animals III - Echinoderms & Chordates

March 17, 19, 21	• Introduction to biodiversity • Measuring biodiversity • Threats to biodiversity. • The value of biodiversity	**Lab Review** Video Assignment (10%) **Due Wed March 19 – 10pm**
March 24, 26, 28	• Global patterns of biodiversity: Why are there more species in the tropics than at the poles? • Regional patterns of biodiversity: Why do larger areas have more species?	**FINAL LAB EXAM (20% of mark)**
March 31, April 2, 4	• Local patterns of biodiversity: What determines the number of species in a community?	**No Lab**
During the exam period	**FINAL LECTURE EXAM (35%)**	

Course Website & Supplementary Resources

Students are required to read the course syllabus.

Some instructors may provide a copy of their lecture notes on CANVAS to you as a courtesy. You are not required to download or print these notes. If notes are posted on CANVAS, then the instructor will try to have lecture notes posted sometime in advance of the lectures; however, they will not guarantee this.

Grading and Assessment Scheme

Grading component	**%**
Mid-term (lecture) exam	12
Final (lecture) exam	35
Pre-class reading assignments (see Canvas)	2
Poll Everywhere (participation marks)	1
Video assignment	10
Laboratory quizzes, spot tests, assignments	20
Laboratory exam	20
Total	**100**

Midterm (Lecture) Exam:

Value: 12% of final course grade
Date: **This midterm lecture exam will be held on Wednesday February 26 (6:30-7:20pm).** Students with a legitimate reason for requiring an alternative writing time for the midterm

exam must **make a request to Dr. Hansen at least two weeks in advance.**

Length: 50 minutes

Format: 40 multiple-choice questions, machine marked.

Description: Based on lecture material prior to February 26. Calculators and all other electronic devices are not allowed.

Final (Lecture) Exam:

Value: 35% of final course grade
Date: Consult Final Exam Schedule

Length: 2.5 hours

Format: 100 multiple-choice questions; machine marked.

Description: The exam is comprehensive in that it will cover all lecture material. However, lecture material delivered after the midterm exam will be emphasized.
A simple calculator is allowed.

Pre-class Reading Assignments:

Value: 2% of the final course grade.
Due date: At the start of each **Monday** lecture.

Format: Short (5-10 multiple-choice questions) quizzes (one per week, except for the first lecture).

Description: The assignments include a short reading from the textbook and a short quiz (5-10 multiple-choice questions). The quizzes will be posted on Canvas and will be marked automatically.

Poll Everywhere Questions:

Value: 1% of the final course grade.
Date: During each lecture.
Format: Each lecture will include 5-10 questions.

Description: See details below.

Video assignment:

Value: 10% of final course grade
Due date: **Wednesday March 19th at 10pm (via Lab Canvas)**

Format:	The video assignment will focus on the topic: "*Human threats to Biodiversity*". Students will be given a choice of open-ended questions to design a short 3- minute video to address one of the questions.
Description:	The video may take any creative delivery format – mock interview, news report, dramatization, presentation for an NGO or government body, etc. Emphasis will be on content, demonstrated understanding of the topic, and confidence in oral delivery mode rather than production quality (smartphone video and free editing software is fine). It is recommended that you develop a storyboard and script before recording your video and be sure to credit any image, text, video or sound sources as per copyright guidelines. A grading rubric will be provided. **Note: that all video submissions must be uploaded in the laboratory section of the course in Canvas**.

Laboratory Assignments & Quizzes:

Value:	20% of final course grade
Date:	see Laboratory Schedule
Format:	Quizzes (written); spot tests; flower project; other in-lab assignments
Description:	The quizzes will be 15-20 minutes in duration and test material from the previous two or three lab exercises. The questions will generally require a short written answer. Spot tests involve images shown in PowerPoint and short questions about the specimen shown. No phones, laptops, tablets or other material allowed. Additional information about the lab quizzes can be found in your lab manual, and will be given in the weeks prior to the assignment.

Laboratory Exam:

Value:	20% of final course grade
Date:	Week of March 24 (during your lab session)
Length:	1.5 hours
Format:	This will be a mixture of spot test, short written answers, and possibly practical questions (slide prep, etc.)
Description:	The exam is comprehensive in that it will cover all laboratory classes. Calculators and all other electronic devices are not allowed.

Pre/Post Course Knowledge Survey:

Value:	1% bonus mark (0.5% for each survey)
Due date:	The first survey must be completed at the start of the term and

	the second survey at the end of the term (see lab Canvas for exact dates).
Format:	Two optional twenty-question surveys will be administered through the lab Canvas.
Description:	At the beginning and end of the course, an optional twenty-question survey will be administered through lab Canvas. The questions will be multiple-choice format, and will cover Biological concepts including prerequisite topics and those taught during the course. The purpose of this survey is to provide your instructors with a better understanding of the background of Biology 121 students; as such, it will not be graded. Completion of each survey will be rewarded with a 0.5% bonus mark, added to the final grade, for a total of 1% if both surveys are completed. Instructions for accessing the surveys will be provided by the Laboratory Coordinator.

Criteria That Must Be Met to Pass

The Laboratory Exam and Lecture Final Exam are required elements, and therefore must be completed by a student to be eligible to pass this course.

University of Saskatchewan Grading System

Students in BIOL 121 are reminded that the University has established a grading system to be used in all courses. Information on literal descriptors for grading at the University of Saskatchewan can be found at: Grades and transcripts - Students | University of Saskatchewan (usask.ca)

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: Appeals in Academic Matters - Governance Office | University of Saskatchewan (usask.ca)

Scheduling of Exams

Midterm and final examinations, and the lab exam, must be written on the date scheduled. **As final examinations may be scheduled at any time during the examination period, students should avoid making prior travel, employment, or other commitments for this period.**

Students must bring their current University of Saskatchewan student card to all in-person exams and be prepared to present it for verification purposes. Entry into certain campus buildings where exams may be held, also requires a valid student card.

It is forbidden for students to utilize in any way during an in-person exam, any electronic device (e.g., cell phone, dictionary, palm pilot, translator, etc.). This includes calculators because these are not required for any exam.

Missed Exams and Quizzes, and Late Assignments

MIDTERM LECTURE EXAM - If a student missed the **midterm exam** through no fault of his/her own due to a medical emergency, death in the family, or other valid reasons, documentation must be provided explaining the absence, to assist in the determination of whether permission will be granted for the student to write a deferred mid-term exam. Students absent for the Midterm Lecture Exam **must advise Dr. Hansen and initiate arrangements for writing a Deferred Mid-Term Exam, within 3 working days of the missed exam** in order to avoid being assigned a grade of zero for the exam.

LABORATORY QUIZZES, SPOT TESTS, PRELAB TESTS & RO SHEETS/WORKSHEETS - If **a student is absent from the quizzes, spot tests and prelab tests due to medical or any other any other university-approved reasons, they must advise Joel Yurach by email within** 3 business days **of the missed assignment to avoid being assigned a grade of zero for that assignment.**

LABORATORY EXAM - If a student is absent from the laboratory exam due to medical or any other valid reason, **they must advise Joel Yurach by email within 3 business days of the missed exam**. Documentation must be provided to explain the absence from the exam and to have an opportunity to write the exam at a later date.

VIDEO ASSIGNMENT - Late submission of the video assignment will incur a **10% penalty per day** for a period of up to 3 days after the due date. Video assignments will not be accepted after this date, except in a case of medical or other valid reason. Questions about this assignment should be directed by email to **Joel Yurach**.

FINAL LECTURE EXAM - If a student missed the **final exam** through no fault of his or her own for medical or any other valid reason, they **must apply to the Dean's Office of the College in which they are registered for an opportunity to write a Deferred Final Exam**, **within 3 working days of the missed exam**. Documentation must also be provided to explain the absence from the final exam. Deferred exams may utilize a different format than the regular exam, at the sole discretion of the instructors.

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

Poll Everywhere: Audience Response System (required for lectures)

Poll Everywhere (https://www.polleverywhere.com/), a web-based polling tool, will be used during lectures. Poll Everywhere allows students to respond to questions anonymously using a computer (laptop and tablets) or mobile device (Apple or Android smartphones). **Poll Everywhere questions provide students with an excellent opportunity to practice applying concepts and test their own learning during class. Responses to Poll Everywhere questions will be worth participation marks (1%).** There is no subscription cost for students to use Poll Everywhere.

To register go to https://pollev.com/register then search **mhansen** then create an account using your **USASK email**. Then select **join presentation**.

When a pool is active, respond at **pollev.com/mhansen**

Note: Statistics and results from Poll Everywhere may be anonymously used for research purposes, for more information please contact the course coordinator.

Student Feedback

Exam questions will not be posted after an exam. Students will be encouraged to meet with the instructor to review their performance anytime during the course by appointment.

Use of Video and 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.

Please remember that course recordings belong to your instructor, the University, and/or others (like a guest lecturer) depending on the circumstance of each session, and are protected by copyright. Do not download, copy, or share recordings without the explicit permission of the instructor.

For questions about recording and use of sessions in which you have participated, including any concerns related to your privacy, please contact your instructor. More information on class recordings can be found in the Academic Courses Policy https://policies.usask.ca/policies/academic-affairs/academic-courses.php#5ClassRecordings.

Copyright

Course material created by your professors and instructors is their intellectual property and cannot be shared without written permission. This includes exams, PowerPoint/PDF lecture slides and other course notes. If materials are designated as open education resources (with a creative commons license) you can share and/or use them in alignment with the CC license. 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 (Copyright Act (justice.gc.ca)).

You are responsible for ensuring that any copying or distribution of materials that you engage in is permitted by the University's Use of Materials Protected By Copyright Policy (see Use of Materials Protected by Copyright - Policies | University of Saskatchewan (usask.ca)). For example, posting others' copyright-protected materials on the open internet is not permitted by this policy unless you have copyright permission or a license to do so. For more copyright information, please visit https://library.usask.ca/copyright/students/index.php or contact the University Copyright Coordinator at copyright.coordinator@usask.ca or 306-966-8817.

Academic Integrity

The University of Saskatchewan is committed to the highest standards of academic integrity. https://academic-integrity.usask.ca/

Students are urged to read the Regulations on Academic Misconduct (see Academic Misconduct - Governance Office | University of Saskatchewan (usask.ca) and to avoid any behaviours that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.

For help developing the skills for meeting academic integrity expectations, see: https://academic-integrity.usask.ca/students.php

Students are encouraged to ask their instructors for clarification on academic integrity requirements.

All students are encouraged to be aware of the rules for courses set out in Academic Courses Policy on Class Delivery, Examinations, and Assessment of Student Learning - Policies | University of Saskatchewan (usask.ca))

Artificial intelligence text generator tools (e.g. ChatGPT) **are not** permitted to be used in any assessments for this course. Any use of such tools will be considered academic misconduct.

Students wanting to connect their assessment in this course to assessments they have completed in another course must get explicit permission of the instructor in order to avoid potential academic misconduct of self-plagiarism.

Important Note: *Additional information about student misconduct specific to BIOL 121 can be found in the laboratory manual. BIOL 121 students are required to read and understand the information about misconduct that is presented in the laboratory manual.*

Access and Equity Services (AES)

Access and Equity Services (AES) is available to provide support to students who require accommodations due to disability, family status, and religious observances.

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.

Students who require accommodations for pregnancy or substantial parental/family duties should contact AES to discuss their situations and potentially register with that office.

Students who require accommodations due to religious practices that prohibit the writing of exams on religious holidays should contact AES to self-declare and determine which accommodations are appropriate. In general, students who are unable to write an exam due to a religious conflict do not register with AES but instead submit an exam conflict form through their PAWS account to arrange accommodations.

Any student registered with AES, as well as those who require accommodations on

religious grounds, may request alternative arrangements for mid-term and final examinations by submitting a request to AES by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by AES.

For more information or advice, visit https://students.usask.ca/health/centres/access-equity- services.php, or contact AES at 306-966-7273 (Voice/TTY 1-306-966-7276) or email aes@usask.ca.

Student Supports

Academic Help – University Library

Visit the University Library's Learning Hub (Learning Hub - University Library | University of Saskatchewan (usask.ca)) to find supports for undergraduate and graduate students with first-year experience, study skills, learning strategies, research, writing, math and statistics. Students can attend workshops, access online resources and research guides, book 1-1 appointments or hire a subject tutor through the USask Tutoring Network (USask Tutoring Network - University Library | University of Saskatchewan)

Connect with library staff through the AskUs chat service or visit various library locations on campus.

Enrolled in an online course? Explore the Online Learning Readiness Tutorial (Welcome - Online Learning Readiness Tutorial - Research Guides at University of Saskatchewan (usask.ca))

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' website http://students.usask.ca.

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. Contact information is available at: (http://artsandscience.usask.ca/undergraduate/advising/)

Financial Support

Any student who faces unexpected 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.

Gordon Oakes Red Bear Student Centre

The Gordon Oakes Red Bear Student Centre) is dedicated to supporting Indigenous student academic and personal success. The Centre offers personal, social, cultural and some academic supports to Métis, First Nations, and Inuit students. The Centre is an intercultural gathering space that brings Indigenous and non-Indigenous students together to learn from, with and about one another in a respectful, inclusive, and safe environment. Visit https://students.usask.ca/indigenous/index.php or students are encouraged to visit the ASC's website https://students.usask.ca/indigenous/gorbsc.php

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. Visit https://students.usask.ca/international/issac.php for more information.