

COURSE SYLLABUS

COURSE TITLE:	BIOL 121 - The Diversity of Life
COURSE CODE:	22165
CLASS SECTION:	01
TERM:	Term 2 2023/2024
COURSE CREDITS:	3.0
DELIVERY:	Lecture & Practicum (Lab)
LECTURE LOCATION:	room 1150 HLTH Building
LECTURE TIME:	12.30 to 1.20 pm (M, W & F)
LECTURE START DATE:	January 5, 2024
LAB LOCATION:	room 1022 Education Building
LAB TIME:	8.30 to 11.20 am (T or Th), or 1.40 to 4.30 pm (M, T, W, Th or F), or 5.30 to 8.20 pm (M or W)
LAB START DATE:	January 8 to 12, 2024
WEBSITE:	via CANVAS

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.

Instructors, Lab Coordinator and Course Coordinator

Contact Information:

Dr. Neil Chilton Instructor Course Co-ordinator	office location: room 320.7 Collaborative Science Research Building e-mail: neil.chilton@usask.ca phone: 306-966-4407
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Mr. Joel Yurach Lab Coordinator	office location room 1021 Education Building phone: 306-966-4421 e-mail: joel.yurach@usask.ca
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Instructor Profiles and other Information:

Dr. Chilton is a Professor in the Department of Biology who teaches and conducts research in biology and in his specialized area of animal parasitology.

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 at the University.

Learning Outcomes

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

1. have an understanding of biological principles (concepts), and that evolution is the unifying principle in biology
2. gain an appreciation for biology as an experimental science [hence, provide necessary background for advanced study of biology and other related disciplines], and realize that an understanding of biological principles requires knowledge of other fields of science (chemistry, physics, geology, geography, mathematics, biochemistry) and many disciplines within biology (e.g., evolution, ecology, genetics, physiology, structure and function, ethology, parasitology, molecular biology, etc.).
3. obtain knowledge of the diversity and complexity of life, which includes how organisms are adapted to their environment and the variation (e.g., morphological, genetic, physiological, behavioral) that exists among individuals of the same species and between individuals of related species
4. be able to think critically regarding scientific issues in our society and understand the importance of relationships between organisms and their environment, and how biodiversity is constantly changing over time

Specifically, students should know:

- What characteristics unite all living organisms, why viruses and prions are considered non-living entities, the differences between unicellular & multicellular organisms and

- heterotrophs & autotrophs, that different organisms reproduce in different ways; with some species using more than one mode of reproduction; the advantages/disadvantages of asexual/sexual reproduction and that water represents the matrix or solvent of life.
- The biological species concept and other ways to define species; the hierarchical system of nomenclature, that museums represent the catalogues of the diversity of life both in time and space, the definition of biological diversity; and the problems with quantifying species diversity.
 - That species are not fixed in time; what Darwin saw and how he made conclusions about his observations that led to the theory of evolutionary change by means of natural selection; and the evidence to support this theory, that some organisms are more suited (better adapted) to their environment, but that this is no guarantee of survival and opportunity to reproduce; the concept of reproductive fitness, that there are differences between species, and variation among individuals in, for example, their morphology, genetics, ethology, ecology, physiological responses to the same environmental conditions, that variation is essential for natural selection to work; natural selection acts on individual organisms but evolutionary change take place at the population level.
 - The differences between microevolution/macroevolution; the principles of homology, analogy & homoplasmy; allopatric species, adaptive radiation, and that evolution is unidirectional, the difference between natural selection/sexual selection; importance of the differences (diversity) between sexes.
 - The difference between biotic and abiotic factors; influence of abiotic factors on the reproductive fitness of organisms.
 - That there is considerable ecosystem diversity – and that environments and the organisms in them have changed over time.
 - What were the first organisms that lived on earth, the importance of O₂ in changing species diversity, why did multicellularity come about, the conquest of land and air (by multiple groups) and the challenges organisms faced and how they were overcome [examples of adaptation], when the ancestors of the representative organisms appeared on earth, and that species diversity has changed over time in response to major environmental changes; e.g. mass extinctions, climatic change [pre-human effects].
 - What is symbiosis and the types of symbiotic relationship; coevolution [arms-race; predator-prey, parasite-host etc.] and the role these play in changing biological diversity; the role of competition, the interrelationships of organisms and biodiversity; concepts of niche, food webs/chains [energy transfer].
 - The relationship between species diversity and the theory of island biogeography, and the relationship between community structure (and trophic relationships) and species diversity in communities, the effect of human (Anthropogenic) influences [fire, invasive species, habitat fragmentation, mining, etc.] on biodiversity over space and time [past, present, future]; including the Canadian prairies, and the concept of biological hotspots, and why the need to conserve biological diversity.

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: There is **no required textbook** for this course. However, if you are interested in a textbook, we recommend using the same textbook as used for BIOL 120 and BIOL 224:

Fenton MB, Maxwell D, et al. 2022. *Biology: Exploring the Diversity of Life*. 5th Canadian edition, Cengage. ISBN 978-0-17-691114-0 (hard copy); 978-1-77-474738-4 (e-Textbook).

or the 4th edition if you already have a copy:

Russell PJ, Hertz PE, et al. 2018. *Biology: Exploring the Diversity of Life*. 4th Canadian edition, Nelson Education. ISBN 978-0-17-671888-6 (hard copy).

Laboratory Class information

- Labs begin in the week of January 8th. **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.
- 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.
- Any other questions regarding the lab should be directed by e-mail to **Joel Yurach**.

Course Schedule

Week/ Dates	Lecture Modules (topics)	Laboratory Activity
Week 1 Jan 3 Jan 5	No lecture on Wednesday Jan 3 rd Module 1: What is Biology? Introduction, species adaptations, and natural history	<i>No lab scheduled this week</i>
Week 2 Jan 8 Jan 10 Jan 12	Module 1 (cont.): Observations & the scientific method Module 2: What is of life? Cells, nutrition & metabolism, homeostasis, responses to stimuli	<i>LAB 1 - Introduction & Prokaryotes</i>
Week 3 Jan 15 Jan 17 Jan 19	Module 2 (cont.): Asexual & sexual reproduction, non-living entities, water is the matrix of life, and adaptations to avoid dehydration	<i>LAB 2 - Protists</i>
Week 4 Jan 22 Jan 24 Jan 26	Module 3: Classifications of organisms and the hierarchy of life. Systematics, taxonomic hierarchies, domains (Eubacteria, Archaea & Eukarya)	<i>LAB 3 - Fungi</i>

Week 5 Jan 29 Jan 31 Feb 2	Module 3 (cont.) . Species concepts and binomial nomenclature, role of museums Module 4: Evolution and variation . Fixity of species	<i>LAB 4 - Green algae, mosses, ferns & club mosses</i>
Week 6 Feb 5 Feb 7 Feb 9	No lecture because of midterm exam Module 4 (cont.) . Lamarck & Darwin (observations) and natural selection	MIDTERM LECTURE EXAM Feb 5th, 6.00 pm <i>No lab scheduled this week</i>
Week 7 Feb 12 Feb 14 Feb 16	Module 4 (cont.) . Variation & microevolution, sexual selection, macroevolution, adaptive radiation, and allopatric speciation	<i>LAB 5 - Conifers & angiosperms</i>
Feb 19 Feb 21 Feb 23	NO CLASSES - Midterm Break	<i>No lab scheduled this week</i>
Week 8 Feb 26 Feb 28 Mar 1	Module 5: History of biodiversity through time . Origin of life, increasing complexity through time, key events, extinctions, rise & fall of the dinosaurs	<i>LAB 6 - Sponges, Cnidarians, Flatworms & Nematodes and</i> <i>LAB 7 - Annelids, Mollusks & Arthropods</i>
Week 9 Mar 4 Mar 6 Mar 8	Module 6: Life is everywhere . Life in the extremes, regional diversity, biodiversity hotspots Module 7: Describing modern biodiversity . Communities	<i>LAB 8 - Echinoderms & Chordates</i>
Week 10 Mar 11 Mar 13 Mar 15	Module 7 (cont.) . Species diversity & ecosystems, Module 8: Interactions between organisms and the Environment . Species distributions & communities	<i>Review Lab</i>
Week 11 Mar 18 Mar 20 Mar 22	Module 8 (cont.) . Species interactions predator-prey, co-evolution, island biogeography, disturbance & succession, food webs, keystone species	<i>Laboratory Exam</i>
Week 12 Mar 25 Mar 27 Mar 29	Module 9: Human threats to biodiversity . Habitat loss, invasive species, over exploitation and pollution	Video Assignment due before 10 pm on Mar 26th <i>No lab scheduled this week</i> <i>University closed (Good Friday)</i>
Week 13 Apr 1 Apr 3 Apr 5	Module 9: (cont.) Climate change, and agriculture in the prairies. Human impact over time. Review Lecture (exam) - Q & A session	<i>No lab scheduled this week</i>

Last day to withdraw from course without academic penalty is Friday April 5th, 2024.

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 endeavour 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	15
Final (lecture) exam	35
Video assignment	10
Laboratory quizzes and spot tests//prelab tests	20
Laboratory exam	20
Total	100

Midterm (Lecture) Exam:

Value: 15% of final course grade

Date: This lecture exam **will be held outside of class time on the evening of Monday, February 5th**. This exam will be scheduled at 6:00 pm, and at a location that will be announced in class and on CANVAS. Alternate writing times will be scheduled for the midterm exam, specifically for students with scheduling conflicts for the February 5th due to requirements in other courses. Students with a legitimate reason for requiring an alternative writing time for the midterm exam must **make a request (by email) to Dr. Chilton before January 22nd** (i.e., 2 weeks before the exam on February 5th).

Length: 50 minutes

Format: 40 multiple-choice questions

Description: Based on lecture material prior to February 5th. Calculators and all other electronic devices are not allowed.

Final (Lecture) Exam:

Value: 35% of final course grade

Date: Consult Final Exam Schedule

Note: **Accommodations will not be made for students making travel arrangements during this time frame.**

Length: 2.5 hours

Format: 100 multiple-choice questions; machine marked

The number and type of questions on the exam is under review at this time, but this information will be provided by the last scheduled lecture period.

Description: The exam is comprehensive in that it will cover all lecture material. However, lecture material delivered after the midterm exam will be emphasized. Calculators and all other electronic devices are not allowed.

Video assignment:**Value:** 10% of final course grade**Date:** Tuesday, March 26th (before 10 pm).**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:** During the week of March 18th (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.**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 (reproduced below) can be found at: <http://students.usask.ca/academics/grading/grading-system.php>

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>

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 in April 2024, 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 Mid-Term Lecture Exam **must advise Dr. Chilton in person or by telephone (not by email) 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 24 hours 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 through due to medical or any other valid reason, **they must advise Joel Yurach by email within 24 hours 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 2 days (= 10 pm Thursday March 28th, 2024). 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)

Prof. Chilton will use Poll Everywhere (<https://www.polleverywhere.com/>), a web-based polling tool, during lectures. It allows Prof. Chilton to ask questions quickly and for students to respond to these questions using their computer (laptop and tablets) or mobile device (Apple or Android smartphones). There is no subscription cost for students to use Poll Everywhere at the U of S.

To register to <https://pollev.com/register> then search **chilton** then join presentation.

When a poll is active, respond at **pollev.com/chilton**.

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](#).

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. 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](#) 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 the [Academic Courses Policy on Class Delivery, Examinations, and Assessment of Student Learning](#).

Artificial intelligence text generator tools (also known as large language models) **are not** permitted to be used in any assessments for this course. Any use of such tools will be considered academic misconduct in this course.

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](#) and [Learning Hub](#) 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](#)

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](#).

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/gorbosc.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.

Prepared by Prof. Neil Chilton, BIOL 121.3 Course Coordinator