

COURSE SYLLABUS

COURSE TITLE:	BIOL 121 - The Diversity of Life
COURSE CODE:	22165
CLASS SECTION:	01
TERM:	Term 2 2022/2023
COURSE CREDITS:	3.0
DELIVERY:	Lecture & Practicum (Lab)
LECTURE LOCATION:	room 1150 HLTH Bldg
LECTURE TIME:	12.30 to 1.20 pm (M, W & F)
LECTURE START DATE:	January 4, 2023
LAB LOCATION:	room 1026 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 16 to 20, 2023
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 & homoplasy; 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 (2022-2023 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 16th. **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 4 Jan 6	Module 1: What is Biology? Introduction, species adaptations, and natural history	No lab scheduled this week
Week 2 Jan 9 Jan 11 Jan 13	Module 1 (cont.): Observations & the scientific method Module 2: What is of life? Cells, nutrition & metabolism, homeostasis, responses to stimuli	No lab scheduled this week
Week 3 Jan 16 Jan 18 Jan 20	Module 2 (cont.). Asexual & sexual reproduction, non-living entities, water is the matrix of life, and adaptations to avoid dehydration	LAB 1 - Introduction & Prokaryotes
Week 4 Jan 23 Jan 25 Jan 27	Module 3: Classifications of organisms and the hierarchy of life. Systematics, taxonomic hierarchies, domains (Eubacteria, Archaea & Eukarya)	LAB 2 - Protists

Week 5 Jan 30 Feb 1 Feb 3	Module 3 (cont.) . Species concepts and binomial nomenclature, role of museums Module 4: Evolution and variation . Fixity of species	LAB 3 - Fungi
Week 6 Feb 6 Feb 8 Feb 10	No lecture – Midterm exam (Monday 6 pm) Module 4 (cont.) . Lamarck & Darwin (observations) and natural selection	No lab scheduled this week
Week 7 Feb 13 Feb 15 Feb 17	Module 4 (cont.) . Variation & microevolution, sexual selection, macroevolution, adaptive radiation, and allopatric speciation	LAB 4 - Green algae, mosses, ferns & club mosses
Feb 20 Feb 22 Feb 24	NO CLASSES - Midterm Break	No lab scheduled this week
Week 8 Feb 27 Mar 1 Mar 3	Module 5: History of biodiversity through time . Origin of life, increasing complexity through time, key events, extinctions, rise & fall of the dinosaurs	LAB 5 - Conifers & angiosperms
Week 9 Mar 6 Mar 8 Mar 10	Module 6: Life is everywhere . Life in the extremes, regional diversity, biodiversity hotspots Module 7: Describing modern biodiversity . Communities	LAB 6 - Sponges, Cnidarians, Flatworms & Nematodes and LAB 7 - Annelids, Mollusks & Arthropods
Week 10 Mar 13 Mar 15 Mar 17	Module 7 (cont.) . Species diversity & ecosystems, Module 8: Interactions between organisms and the Environment . Species distributions & communities	LAB 8 - Echinoderms & Chordates Video Assignment due before 10 pm on Mar 17 th
Week 11 Mar 20 Mar 22 Mar 24	Module 8 (cont.) . Species interactions predator-prey, co-evolution, island biogeography, disturbance & succession, food webs, keystone species	Review Lab
Week 12 Mar 27 Mar 29 Mar 31	Module 9: Human threats to biodiversity . Habitat loss, invasive species, overexploitation, pollution, climate change, and agriculture in the prairies.	Laboratory Exam
Week 13 Apr 3 Apr 5	Module 9: (cont.) Human impact over time. Review Lecture (exam) - Q & A session	No lab scheduled this week

Last day to withdraw from course without academic penalty is Wednesday April 5th, 2023.

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 6th**. This exam will be scheduled at 6:00 pm, and at a location that will be announced in class. Alternate writing times will be scheduled for the midterm exam, specifically for students with scheduling conflicts for the February 6th 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 23rd** (i.e., 2 weeks before the exam on February 6th).

Length: 50 minutes

Format: 40 multiple-choice questions

Description: Based on lecture material prior to February 6th. 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:** Friday, March 17th (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 27th (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 2023, 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 Sunday March 19th, 2023). 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>

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 materials are provided to you based on your registration in a class, and anything created by your professors and instructors is their intellectual property, unless materials are designated as open education resources. This includes exams, PowerPoint/PDF slides, course notes and lecture recordings. 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.php> where there is information for students available at <https://library.usask.ca/copyright/students/rights.php>, or contact the University's Copyright Coordinator at <mailto:copyright.coordinator@usask.ca> or 306-966-8817.

Integrity Defined (from the Office of the University Secretary)

All students should read and be familiar with the Regulations on Academic Student Misconduct (<https://governance.usask.ca/student-conduct-appeals/academic-misconduct.php> - [StudentAcademicMisconductRegulations](#)) as well as the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals (<https://governance.usask.ca/student-conduct-appeals/non-academic-misconduct.php>)

For more information on what academic integrity means for students see the Academic Integrity section of the University Library Website at: <https://library.usask.ca/academic-integrity.php>

You 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 - <https://libguides.usask.ca/AcademicIntegrityTutorial>

There are also valuable resources on the Integrity Matters website: <https://academic-integrity.usask.ca/>

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)

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. . 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 Support for Students

Visit the [Learning Hub](#) to learn how the University Library supports undergraduate and graduate students. Attend online or in-person workshops, review online resources or book 1-1 appointments for help with:

- First year experience
- Research
- Study strategies and skills
- Writing
- Math and Statistics

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://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/>)

Prepared by Prof. Neil Chilton, BIOL 121.3 Course Coordinator