

COURSE SYLLABUS

COURSE TITLE:	BIOL 120.3 – The Nature of Life		
COURSE CODE:	22170	TERM:	Winter 2023
COURSE CREDITS:	3.0	DELIVERY:	In-person Lecture & Practicum (Lab)
CLASS SECTION:	01	START DATE:	Wednesday, January 4, 2023
CLASS LOCATION:	Health Sciences Building room 1150		
CLASS TIME:	10:00 am to 11:20 am (T/Th)		
LAB LOCATION:	EDUC Rm 1020 EDUC Rm 1026	LAB TIME:	8:30 to 11:20am (T/Th); 1:30 to 4:20pm (M/T/W/Th/F); 5:30 to 8:20pm (M/T/W/Th)
INSTRUCTORS:	Ambrose / TBD	WEBSITE:	Via Canvas

TREATY ACKNOWLEDGEMENT

As we gather here today, 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.

CATALOGUE DESCRIPTION

An introduction to the underlying fundamental aspects of living systems that covers cell biology, genetics and the evolutionary processes which lead to complex, multicellular life forms.

PREREQUISITE(S)

Biology 30 or BIOL 90 or BIOL 107 or BIOL 108.

Note: Chemistry 30 is strongly recommended. Students with credit for BIOL 110 will not receive credit for BIOL 120.

OVERVIEW OF THE COURSE

This course is designed to introduce you to the vast and exciting field of biology, with a focus on events that are not normally visible to the naked eye. Covering topics in cell biology, genetics and evolution, BIOL 120.3 is one of two foundation courses for biology majors and for students going into Natural Sciences (Program C). BIOL 120.3 also counts towards the biology requirements of a number of programs in different colleges across campus. BIOL 121.3 - The Diversity of Life - is the sister course to BIOL 120.3, and focuses on biological diversity, evolution, adaptations of organisms to specific environments, and the factors influencing changes in biodiversity over time and space.

LEARNING FORMAT

This term, BIOL 120 will be delivered entirely with in-person lectures and labs. Course material will be prepared and posted to the course management system Canvas in advance of most scheduled lectures, such that students are encouraged to access this material before or during each lecture (see the Course Schedule below).

In the event that it becomes necessary during this term for BIOL 120 instructors to record lecture or laboratory materials for uploading to Canvas, note that these materials belong to your instructor and the University of Saskatchewan, and are *copyright protected*. You are permitted to download session videos and materials for your own academic use but, accordingly, you should not copy, share, or use them for any other purposes without explicit permission from the instructor.

ANTICIPATED LEARNING OUTCOMES

By the end of BIOL 120.3, you should be able to describe, classify, and discuss aspects of cell theory, cell division, genetics, bioenergetics, and the molecular basis for variation and natural selection. The laboratory portion of the course will help link these topics together with hands-on exercises. After completing the lab section of the course, you should know how to use a microscope to visualize cells and tissues and how to solve basic genetics problems. Detailed learning objectives for each lecture topic have been prepared and will be posted in Canvas.

INSTRUCTOR CONTACT INFORMATION

Lecturers:

Dr. Chris Ambrose
Section Coordinator

Rm 220.7 Collaborative Science Research Building (CSRB)
e-mail: chris.ambrose@usask.ca Telephone: (306) 966-4409
Office Hours: After each lecture or by appointment

TBD

Lab Coordinator:

Mr. Paul Dick, M.Sc.

Rm 1021 Education Building
e-mail: paul.dick@usask.ca

Mr. James Bush, M.Sc.
Coordinator for Mindtap

Rm G11 Thorvaldson Building
e-mail: james.bush@usask.ca

INSTRUCTIONAL RESOURCES: TEXTBOOK AND LAB MANUAL

The recommended textbook for BIOL 120.3 is ***Biology - Exploring the Diversity of Life (5th Canadian Edition)*** by Fenton *et al.*, Nelson Education Ltd. This textbook is available from the U of S Bookstore in various formats, which all contain Mindtap and a copy of the e-text. There is a special code required in order to access Mindtap and the e-text, which will be made available early in Term 2 by Mr. J. Bush.

There is a smaller, hard-copy version (known as Volume 1), which mostly contains the chapters utilized in BIOL 120.3, alone. The textbook is available in its full length (for students who also plan on taking BIOL 121.3 and/or 224.3). Two copies are being held on reserve at the Circulation Desk in the Science Library.

Note that the textbook will be referred to regularly during lectures, both in terms of content and for the use of visual aids. It is also helpful for reviewing the material. However, it is not essential to bring your textbook to lectures. The textbook material that you are responsible for is outlined on the second-last page of this syllabus and will be the core testable material for the course. The lectures are intended to highlight and reinforce key concepts. Please see the ***Learning Objectives Summary***, which will be posted on Canvas with this Syllabus, for a more detailed description of the topics for which you will be responsible in preparation for the lecture midterm exam and final exam. Note that all regular lecture sections of this course will have common midterm and final exams.

The BIOL 120.3 Lab Manual (2022-23 Edition) is also required for this course and is available for purchase through the U of S Bookstore. Note that labs start during the week of January 9-13, 2023.

ONLINE RESOURCES

There are a number of online resources to help support your learning in BIOL 120.3. We highly recommend the use of these resources as a means to help increase your performance and success in this course.

Canvas is the University of Saskatchewan learning platform where you will be able to access the course's detailed Learning Objectives, posted lecture notes (at the discretion of each instructor), and any other resources.

When purchasing a copy of the textbook from the U of S Bookstore, the individual student also receives access to an online platform termed Mindtap. This platform provides access to a digital copy

of the textbook, and to other resources like animations and self-tests. Note that the Mindtap platform will *not* be used for any mandatory, online quizzes in BIOL 120.

STRUCTURED STUDY SESSIONS (STUDENT LEARNING SERVICES)

BIOL 120 Structured Study Sessions are weekly *peer-led study sessions that run throughout the term. These regularly scheduled Study Sessions give you the opportunity to review and complete exercises on the course material, revisit more difficult concepts, and prepare for the midterm and final exams.

All BIOL 120 students are welcome to attend the Structured Study Sessions. Pre-registration is not required and attendance is free. All that you need to do is show up to the session at the scheduled time and location and be open to learning. For more information, including the schedule of sessions, watch your course Canvas site or visit <http://library.usask.ca/sss>.

*Note: Experienced students who have already completed BIOL 120.3 and achieved an excellent grade, run the Structured Study Sessions. Research has shown that students who attend Structured Study Sessions achieve higher grades, on average, than those who do not.

STUDENT REVIEW AND COURSE PREPARATION (PURPLE PAGES)

There is prerequisite material that will not be covered directly in lectures. This material is expected knowledge from high school courses. Students should review this information ahead of time because it is important for the understanding of many basic biological topics we will cover.

In Fenton *et al.*, you will find this section near the middle of the book denoted by the purple colouring (pgs. F1-44) – for that reason, these are known as “The Purple Pages”. This section contains basic information about the chemical and physical foundations of Biology, as well as a review of the macromolecules that make up living things (proteins, nucleic acids, carbohydrates, and lipids). Knowledge of much of this information will be needed to understand course content and answer questions on the lab quizzes, and the lecture midterm and final exams.

EVALUATION

The final course grade is calculated as follows:

Lecture Midterm Exam	15%
Lecture Final Exam	35%
Lab Quizzes and Assignments	25%
Lab Practical Exam	5%
Lab Exam	20%
Total	100%

Learning Assessment Details

Lab Quizzes and Assignments: There are 5 lab assessments (including quizzes and a written paper) worth together 25% of the course grade. Assignment details, including question type and scope, will be provided prior to each assessment. The general assignment schedule is included on the last pages of this syllabus. Consult the 2022-23 Lab Manual for the procedure to follow for missed lab quizzes and assignments.

Lab Practical Exam: An assessment of practical skills (including care and use of a microscope, preparation of a wet mount slide, and accurate drawing and labeling of microscopic objects) worth 5% of the course grade will be held during the week of January 30 – March 3.

Lecture Examinations: Students must bring their current University of Saskatchewan student card to all exams and be prepared to present it for verification purposes. Also bring an HB pencil plus an eraser. It is forbidden for students to utilize any type of electronic device during an exam (e.g., cell phone, dictionary, translator, head-phones, etc.) (see Academic Honesty section below).

The single **Midterm Lecture Exam** will be held in-person and outside of class time on the early evening of **Thursday, February 9th, 2023 from 5:30-6:30 pm**, at an on-campus location to be

announced. This exam will consist of 40 multiple-choice questions to be answered within 1 hour (60 minutes). In the event that you have a legitimate U of S timetabling conflict for this scheduled exam, you must contact your instructor right away in order to make arrangements for an alternate date for you to write a Deferred Midterm Lecture Exam.

If you are absent from the **February 9th** exam due to a medical emergency or another exceptional circumstance, you must advise your instructor within **THREE WORKING DAYS** of the missed exam providing explanatory documentation to initiate discussion about whether you qualify for a Deferred Exam. If you do not advise your instructor within three working days, or do not have an acceptable excuse, a grade of zero will be assigned for the Lecture Midterm Exam.

The **Final Lecture Exam** will be scheduled by the Examinations Office to take place within the exam period of **April 10th – 29th, 2023**. This in-person exam will consist of 100 multiple-choice questions to be completed in 2.5 hours (150 minutes). Accommodations **will not be made** for students making travel arrangements during this time frame. The final exam schedule for Term 2 typically becomes available by late February. If you are absent from the Final Lecture Exam for a legitimate reason, within **THREE WORKING DAYS** of the missed exam, you may apply for consideration of a Deferred Final Lecture Exam to the Dean's Office of the College in which you are registered.

Laboratory Examination: You will write this exam during your lab slot, during the week of March 27-31, following the week of lab review. This examination will assess knowledge and understanding of all laboratory material. More details will be announced in lab closer to this exam. Consult the 2022-23 Lab Manual for the procedure to follow if you miss the Lab Exam.

Students are encouraged to review all University examination policies and procedures:
<http://policies.usask.ca/policies/academic-affairs/academic-courses.php>.

IMPORTANT ACADEMIC DATES

Tuesday, Jan. 17th – Last day to withdraw from Term 2 (Winter) classes with 100% tuition credit.
Monday, Jan. 24th – Last day to withdraw from Term 2 (Winter) classes with 75% tuition credit.
Monday, Jan. 31st – Last day to withdraw from Term 2 (Winter) classes with 50% tuition credit.
Tuesday, Apr. 5th – Last day to withdraw from Term 2 (Winter) classes.

LABORATORIES

Labs begin during the week of January 9th, 2023. PAWS registration will give you a time and day of the week for your lab section and the general lab schedule is provided on the final page of this syllabus. Room assignments are made by the Lab Coordinator (i.e. **not** PAWS) and will be posted on Canvas immediately before your first scheduled lab. Students are expected to attend, and be prepared for, all scheduled labs, lab reviews and lab assessments. Consult the Lab Manual for the procedure to follow for a missed lab.

The 2022-2023 edition of the Lab Manual for Biology 120.3 is **required for all labs**. Please make sure that you have read the lab instructions and are prepared for the assigned exercises **before** going to each of your scheduled lab sessions. Any other questions regarding the lab should be directed to the Lab Coordinator.

STUDENTS WRITING 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.

For information on AES services and Covid-19 protocols, please visit <https://words.usask.ca/dss/2020/03/25/final-exam-accommodations-covid-19-protocols/>

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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 is therefore prohibited. Doing so would require 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 copyright.coordinator@usask.ca or 306-966-8817.

RECORDING OF THE COURSE

Lectures in BIOL 120.3 are intended to be delivered in-person throughout this term. Should changes become necessary, remember that any course recordings belong to your instructor and the University and are protected by copyright. Accordingly, you must not copy or share recordings without the explicit permission of the instructor.

For questions about recording and use of any recorded 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>.

ACADEMIC INTEGRITY (from the Office of the University Secretary)

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

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

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#AboutAcademicIntegrity>.

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://library.usask.ca/academic-integrity.php#AcademicIntegrityTutorial>

STUDENT SUPPORT

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>

Class and study tips <https://students.usask.ca/study/get-prepared.php>

Study skills materials <https://libguides.usask.ca/studyskills>

A guide on netiquette, principles to guide respectful online learning interactions

<https://teaching.usask.ca/remote-teaching/netiquette.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 <http://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>).

Aboriginal Students' Centre

The Aboriginal Students' Centre (ASC) is dedicated to supporting Aboriginal 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 also dedicated to intercultural education, bringing Aboriginal and non-Aboriginal students together to learn from, with and about one another in a respectful, inclusive and safe environment. Students are encouraged to visit the ASC's Facebook page (<https://www.facebook.com/aboriginalstudentscentre/>) 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 students.usask.ca or updates.usask.ca for more information.

Recommended Technology for Remote Learning, if Necessary

All aspects of this course during Term 2, ranging from lectures and labs to evaluative components such as exams and quizzes, are intended to be delivered and completed, in-person. In the event that delivery modes must change while this course is in progress, students are reminded of the importance of having the appropriate technology for remote learning. The list of recommendations can be found at <https://students.usask.ca/study/tech-requirements.php>.

TEXTBOOK READINGS

Please note: Materials in the following sections from the textbook by Fenton *et al.* constitute all of the testable material for the lecture exams. The lecture presentations are meant to highlight and synthesize essential concepts, and to provide opportunities for class discussion and interaction.

5th Edition - Fenton et al: *Biology – Exploring the Diversity of Life*

Chapter 2 – The Cell: An Overview – §2–2.5c

Chapter 4 – Cell Membranes and Signaling – §4–4.6b

Chapter 7 – Cell Cycles – §7–7.4b

Chapter 8 – Genetic Recombination (Meiosis) and Life Cycles – §8.3a-d

Chapter 3 – Energy and Enzymes – §3–3.5d, 3.6a, 3.6d

Chapter 1 – Defining Life and its Origins – §1–1.5b (skip 1.5a), 1.6a-d, 1.7c

Chapter 9 – The Chromosome Basis of Mendelian Inheritance – §9–9.2f

- Chapter 10 – Genetic Linkage, Sex Linkage, and Other Non-Mendelian Inheritance Mechanisms – §10–10.2d, 10.4a-d
- Chapter 11 – DNA Structure, Replication, and Repair – §11–11.3h
- Chapter 12 – Gene Structure, Expression, and Mutation – §12–12.5a
- Chapter 5 – Cellular Respiration – §5–5.7d
- Chapter 6 – Photosynthesis – §6–6.5c

Textbook Readings for older textbook editions:

4th Edition - Russel et al: Biology – Exploring the Diversity of Life

- Chapter 2 – The Cell: an Overview – §2–2.5c
- Chapter 4 – Cell Membranes and Signaling – §4–4.6b
- Chapter 7 – Cell Cycles – §7–7.4b
- Chapter 8 – Genetic Recombination (Meiosis) and Life Cycles – §8.3a-d
- Chapter 21 – Defining Life and its Origins – §21–21.5d, 21.6c, 21.7b,c
- Chapter 3 – Energy and Enzymes – §3–3.5d, 3.6a, 3.6d
- Chapter 9 – The Chromosome Basis of Mendelian Inheritance – §9–9.2f
- Chapter 10 – Genetic Linkage, Sex Linkage, and Other Non-Mendelian Inheritance Mechanisms – §10–10.2d, 10.4a-d
- Chapter 11 – DNA Structure, Replication, and Repair – §11–11.3h
- Chapter 12 – Gene Structure, Expression, and Mutation – §12–12.5a
- Chapter 5 – Cellular Respiration – §5–5.7d
- Chapter 6 – Photosynthesis – §6–6.4c

3rd Edition - Russel et al: Biology – Exploring the Diversity of Life

- Chapter 2 – The Cell: an Overview – §2–2.5c
- Chapter 8 – Cell Cycles – §8–8.4
- Chapter 9 – Genetic Recombination (Meiosis) and Life Cycles – §9.3a-d
- Chapter 3 – Defining Life and its Origins – §3–3.5f
- Chapter 4 – Energy and Enzymes – §4–4.5d, 4.6a, 4.6d
- Chapter 5 – Cell Membranes and Signalling – §5–5.6b
- Chapter 10 – Mendel, Genes, and Inheritance – §10–10.2
- Chapter 11 – Genes, Chromosomes, and Human Genetics – §11–11.2
- Chapter 12 – DNA Structure, Replication, and Organization – §12–12.3
- Chapter 13 – Gene Structure and Expression – §13–13.4
- Chapter 6 – Cellular Respiration – §6–6.7d
- Chapter 7 – Photosynthesis – §7–7.4c

LECTURE (Section 01) AND LAB SCHEDULE FOR BIOL 120.3 (January – April 2023)

	<u>Lecture Topic</u>	<u>Lab Topic</u>	<u>Assessment</u>
Week 1 Jan. 4	Introduction, Microscopy (Ambrose)	NO LAB	
Week 2 Jan. 9 – 13	Cell Biology (Ambrose)	1. Introduction, Microscopy & Cells	
Week 3 Jan. 16 – 20	Cell Biology (Ambrose)	2. Eukaryotic Cell Structure & Function	Quiz on Lab 1
Week 4 Jan. 23 – 27	Cell Membrane Structure and Function, Cell Cycle (Ambrose)	3. Osmosis & Cell Division	

Week 5 Jan. 30 – Feb. 3	Mitosis, Meiosis (Ambrose)	Practical Assessment Cell Division	Practical Assessment
Week 6 Feb. 6 – 10	Energy and enzymes (Ambrose)	NO LAB	Lecture Midterm Exam Thursday, February 9th, 5:30 – 6:30pm
Week 7 Feb. 13 – 17	Origins of life (Ambrose) Mendelian Genetics (TBD)	4. Sexual Life Cycles & Meiosis	Quiz on Labs 2 and 3
Week 8 Feb. 20 – 24	----- Term 2 Study Break (No Lectures or Labs) -----		
Week 9 Feb. 27 – Mar. 3	Chromosomal Genetics, Human Genetics (TBD)	5. Introduction to Genetics	Spot Test on Lab 4
Week 10 Mar. 6 – 10	DNA Structure & Replication; Gene expression (TBD)	6. Human Genetics & Gene Linkage	
Week 11 Mar. 13 – 17	Gene expression - Transcription, Translation (TBD)	7. Biotechnology – Techniques & Applications	Genetics Quiz Biotech Topic Due
Week 12 Mar. 20 – 24	Cellular Respiration (TBD)	Lab Review	Biotech Summary Due
Week 13 Mar. 27 – 31	Photosynthesis (TBD)	Lab Exam	Lab Exam
Week 14 Apr. 3 - 5	Photosynthesis (Wei) Review (Ambrose/TBD)	NO LAB	

FINAL LECTURE EXAM SCHEDULE: Apr. 10 – 29, 2023

The date and location of the BIOL 120.3 Final Lecture Exam will be announced by the Examinations Office.