

## **BIODIVERSITY AND ECOLOGY (BIOL 226/01)**

Course Outline: September 2021

3 Credit units

*In the event of further extraordinary circumstances and pursuant to the [Academic Regulations](#), the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the changes. Note: I will highlight any changes to the syllabus since posting the original course outline in red text.*

### **Instructor: Dr. Eric Pedersen, Department of Biology**

*Email:* [eric.pedersen@concordia.ca](mailto:eric.pedersen@concordia.ca)

*Email policy:* I will try to answer your emails promptly. However, it may take up to 48 hours to get back to you, so please plan accordingly. Please include the course number (BIOL 226) in the subject line to make sure I see it. I am most likely to see your message if you send it via the Moodle messaging system, rather than via email.

*Office hours:*

Monday 1:15 PM – 2:30 PM in person (Room SP 401-05)

Wednesday, 1:15 PM – 2:30 PM via Zoom video meeting:

[concordia-ca.zoom.us/j/93280199834?pwd=STN1L0M5Mk5RR3dMa2JPdURZSjdqQT09](https://concordia-ca.zoom.us/j/93280199834?pwd=STN1L0M5Mk5RR3dMa2JPdURZSjdqQT09).

(meeting ID 93280199834, password 744803). These office hours are open to all, and I will be encouraging students to ask questions here where other students can benefit from the answers. However, I will be available to meet one-on-one with anyone who would prefer to speak privately either during office hours or by appointment.

*Adapting to online learning:* This course will be entirely online. Lecture material will be delivered asynchronously (meaning you can watch it whenever you want) via video on the Concordia Moodle platform. Discussing the material with peers and asking questions are a vital part of learning any subject; normally you would be able to do this during the class period. To make up for this, there is an overall course discussion group that you can post questions to, and you have been assigned to small discussion groups. You will also be able to ask questions during my office hours (see above) or via email.

### **Teaching Assistants**

*To be announced*

### **Course Description**

*Class time:* This class is scheduled on Mondays and Wednesdays, 1:15-2:30 PM; however, all lecture material will be pre-recorded and released on Moodle at the start of each week. The scheduled class time is reserved for class discussion and Q&A, office hours, and the midterm exam. I will be at my office in the SP Building (SP 401-05) Mondays, and on Zoom on Wednesdays. During the scheduled time, I will be covering answers to the previous week's

assignment, leading discussions on the material and answering questions about the prior week's material. **Attendance is not mandatory, but I do encourage coming to at least one meeting a week**, as I will only be recording and posting the assignment answers and responses to frequently asked questions online; any live discussions will not be recorded.

*Description:* This course introduces the evolution, biodiversity, and ecology of organisms. The origin and diversity of life, from prokaryotes through simple eukaryotes to multi-cellular organisms are introduced. Natural selection, speciation, and phylogeny, stressing evolutionary relationships in conjunction with changing conditions on earth, are presented. The course introduces major concepts in ecology: the physical and chemical environment, population structure, life histories, species interactions, communities, and ecosystems. Lectures only.

*Prerequisites:* CEGEP Biology 1 or BIOL 201 or permission of the instructor.

*Course Objectives:* Students will learn the fundamental principles of evolutionary theory and use this knowledge to explore the evolution of biodiversity on earth. By the end of the course, students will be familiar with the major groups of organisms, including when they first appeared on earth and how they are related to one another. Students will also learn basic ecological theory and begin to use these principles in understanding the concept of sustainability and proposing solutions to the major environmental problems facing the biosphere.

*Required Materials:*

- **Textbook:** Campbell Biology, 3<sup>rd</sup> Canadian Edition. J.B. Reece, et al. 2020. Pearson. You can get either the paper or online copy. **If you are outside of Canada currently, the best way to get access to the Canadian Edition is to purchase an online version through Pearson MyLab. Go to <https://mlm.pearson.com/northamerica/>, then register as a student. The course ID for this class is pedersen92087. Note on earlier editions: the First and Second Canadian Editions are also okay. Course texts are also available on reserve from the library. Readings for the first and second edition are marked in the syllabus.**
- **Moodle access:** Lectures will be shared weekly on Moodle, as will assignments, short quizzes, and the midterm and final exams. Class discussions will also take place on Moodle. You are required to use Moodle for this class, and it is your responsibility for ensuring you know how to use it to access course materials. Moodle should work on all platforms as long as you have access to an internet browser.

I will be using the Zoom video conferencing platform (<https://zoom.us/>) for meeting with students. You are not required to use video during any Zoom call if you do not want to, and if this platform does not work for you, let me know via email prior to our meeting so we can arrange for an alternative approach.

*Course Philosophy:* I expect students to *watch the video lectures, read the assigned chapter, answer the Assigned Questions, and work through the quizzes* each week. This material will form the backbone of your notes for the course. I also expect students to actively participate in their group discussions and on the course discussion board. I do not cover the entire chapter in recorded talks. Instead, I will use the lectures to concentrate on difficult topics, give more

information on ideas that are not in the book, work through problems, answer questions, etc. I strongly recommend reading the relevant textbook chapter(s) after watching the week's lecture.

Pre- and post-course assessment: You will be expected to complete a short knowledge assessment quiz at the start and end of the course. This is so I can learn what background knowledge you are bringing to the course, and to learn how effective my teaching was for conveying key ideas. Each assessment will be a short true/false quiz posted on the Moodle platform; you will have 30 minutes to complete it. The pre-class assessment will be due by the end of the first week of class, and the post-class assessment will be due before the final exam. You will not be graded based on your performance on these assessments, only on whether you complete them (you will get 3% for completing both assessments). However, as this information is very important to me, I do expect you to make a good-faith attempt to answer the assessment; as such, evidence of answering the questions as quickly as possible or at random will result in you losing these participation marks.

Active learning grades: Each lecture will be accompanied by questions designed to test your understanding of the material you've seen, interspersed throughout the videos. You will receive participation grades based on the fraction of these questions that you have attempted.

Assigned Questions: Students will hand in answers to the Assigned Questions electronically via Moodle by 6 PM Friday the week they are due. Answers will be graded by the T.A. and returned via Moodle. Students are expected to complete but not hand in the Definitions and Review Exercises; these are for your own study notes. Each student must hand in his/her own work (see below). Late submissions (i.e. after 6 pm on the due date) will not be accepted. Grade based on the average of all assignments, but **you can miss up to two assignments**, no questions asked, without penalty; your grade will be based off the remaining submitted assignments.

Weekly quizzes: Each week (except for the week of the midterm), you will have a short multiple-choice quiz posted at the start of the week on Moodle. The first five quizzes are due prior to the midterm, and the last seven are due before the final exam. You will have two attempts at each quiz, with 15 minutes per attempt. Your mark for each quiz will be the average of your two attempts.

Academic Misconduct: Copying from other students or from last year's assignments defeats the purpose of the assigned questions and is plagiarism "**the presentation of the work of another person as one's own or without proper acknowledgement**" (see Article 17.10.3 III of the Undergraduate Calendar).

What are you responsible for? In decreasing order of importance: (1) what we cover in class, (2) your answers to Definitions, Assigned Questions and Review Exercises, and (3) any assigned reading material not covered in assigned questions or lectures.

What to do when ill? Assignment questions: **you can miss up to 2 assignments without affecting your grade**, so I do not accept late submissions. The marking scheme is generous because there will be **no exceptions for illness etc.** Tests: there will be no make-up midterm. Email me **before the test** to let me know that you are ill or have some legitimate reason (e.g.

religious holiday or funeral) for not writing, and I will increase the value of your final exam to compensate for the missing test.

Evaluation:

- 3%            Answering both the pre- and post-course knowledge assessment quizzes. **You will not be graded on how you perform on these assessments**, but you will receive participation marks if you attempt both quizzes. See above for details.
- 2%            Active learning and participation: attempting concept questions during the lecture. Your mark is based just on the number of attempted questions, not whether you get the questions right. See above for details.
- 10%           Weekly short, timed quizzes on Moodle. Posted at the end of each week. The first five quizzes will be due *the day before the midterm*. The second seven quizzes will be due *the day before the final exam*.
- 10%           Weekly assignments (11 total assignments). Graded by the TAs. Assignments should be submitted via Moodle and are due by 6 PM on Friday the week they are posted. I will go through the assignment answers the week after each assignment is due. Grade based of the average of all assignments, but **you can miss up to two assignments**, no questions asked, without penalty; your grade will be based off the remaining submitted assignments.
- 30%           Midterm (online via Moodle but held during the class period); if you miss the midterm for a **valid** reason and have discussed this with the professor prior to the exam your final counts for 30% more. The midterm will consist of a mixture of multiple choice, short-answer, and long-answer questions.
- 45/60/75%\*   Final Exam (about 70% the questions on this test will be based on material covered after the midterm). If your grade on the final exam is > than your grade on the midterm then the midterm will count for only 15% and your final exam will count for 60%.

You have the right to respond to any written question in French if you choose.

A+≥90, A=85-89, A-=80-84, B+=77-79, B=73-76, B-=70-72, C+=67-69, C=63-66, C-=60-62, D+=57-59, D=53-56, D-=50-52, F<50

How to do well in BIOL 226? Watch **all** lectures and take your own notes from them, participate **actively** in your group discussions, hand in **all** assignments and complete **all quizzes**, keep **up to date** with the readings, and study **interactively** by yourself or with a friend. If you find you are struggling with this course, it is in your best interest to see either the TA or instructor *early* so that we can provide resources and guidance. We are here to help you succeed, but it will become increasingly difficult to change your situation as the course goes on.

## Schedule of Lectures and Assignments

<u>DATE</u>	<u>Topics</u>	<u>Readings and assignments</u> Page numbers refer to the 3 <sup>rd</sup> Can. ed. of the textbook. 2 <sup>nd</sup> Can ed: in paratheses (), 1 <sup>st</sup> Can ed: superscripts
Week 1: Sept 6 <sup>th</sup> - 10 <sup>th</sup>	1. Introduction to the course 2. What is evolution & why we know life evolved	“Evidence for evolution” <a href="http://www.khanacademy.org/science/biology/her/evolution-and-natural-selection/a/lines-of-evidence-for-evolution">www.khanacademy.org/science/biology/her/evolution-and-natural-selection/a/lines-of-evidence-for-evolution</a> Ch 22 Section 22.3 Ch 26 Section 26.5: molecular clocks <b>September 10<sup>th</sup>: Deadline for completion of pre-course knowledge assessment</b>
Week 2: Sept 13 <sup>th</sup> – 17 <sup>th</sup>	1. Basics of evolution: populations, heredity, and variation 2. Mechanisms of evolution: mutation and natural selection	Ch. 22 (except 22.3) Ch. 23.1 <b>and 23.2</b> <b>Quiz #1 posted</b> <b>Assignment #1: Ch. 22 and 23</b>
Week 3: Sept. 20 <sup>th</sup> – 24 <sup>th</sup>	1. Mechanisms of evolution: Drift, and Gene flow 2. Interactions between evolutionary mechanisms 3. Origin of Species <b>Answers to assignment #1</b>	<b>Ch 23.3 and 23.4</b> Ch 24 <b>Quiz #2 posted</b> <b>Assignment #2: Ch. 24</b>
Sept 20	<b>Deadline for withdrawal with tuition refund</b>	
Week 4: Sept 27 <sup>th</sup> – Oct 1 <sup>st</sup>	1. Macroevolution and phylogeny 2. Biodiversity and life cycles <b>Answers to assignment #2</b>	Ch 25: Table 25.1; Mass ext'n's: 570-574 (565-570 <sup>556-560</sup> ); Evol'n is not goal oriented: 578 – 579 (574-575 <sup>565-567</sup> ); Ch 26, Concept 26.3 592-597 (589-593 <sup>582-584</sup> ) Ch 26, Concept 26.6 (589-592 <sup>551-553</sup> ) Ch 13, Concept 13.2 <b>Quiz #3 posted</b> <b>Assignment #3: Ch. 25&amp;26</b>
Week 5: Oct 4 <sup>th</sup> – 8 <sup>th</sup>	Prokaryotes <b>Answers to assignment #3</b>	Ch 25, 1 <sup>st</sup> single-celled organisms and photosynthesis and the oxygen revolution: 564 (559-60 <sup>551</sup> ) Ch 27 <b>Quiz #4 posted</b> <b>Assignment #4: Ch. 27</b>
Oct 11 <sup>th</sup>	Thanksgiving Day – University closed	
Week 6: Oct. 11 <sup>th</sup> – 15 <sup>th</sup>	Protists <b>Answers to assignment #4</b>	Ch 25, The first eukaryotes: 564 (560 <sup>552-53</sup> ) Ch 25, Cambrian explosion: 566 (561-62 <sup>553-4</sup> ) Ch 28 <b>Quiz #5 posted</b> <b>Assignment #5: Ch. 25, 28, 32</b>
Oct 20 <sup>th</sup>	<b>Midterm exam: all material up to the end of week 6</b>	
Week 7: Oct 18 <sup>th</sup> – 22 <sup>nd</sup>	1. Animals 2. Midterm	Ch 32 <b>Quizzes #1-6 Due October 19<sup>th</sup>, 11:59 PM</b>
Week 8: Oct 25 <sup>th</sup> – 29 <sup>th</sup>	1. Fungi 2. Nonvascular plants and plant lifecycles <b>Answers to assignment #5</b>	Ch 25, colonization of land: 566 (562 <sup>554</sup> ) Ch 31 Ch 29 <b>Quiz #6 posted</b>

		<b>Assignment #6: Ch 29, 31</b>
Week 9: Nov 1 <sup>st</sup> – 5 <sup>th</sup>	1. Vascular plants 2. Introduction to Ecology <b>Answers to assignment #6</b>	Ch 30 Ch 52, concept 52.1, 52.4, <del>52.5</del> <b>Quiz #7 posted</b> <b>Assignment #7: Ch 30, Ch 52</b>
Nov 8 <sup>th</sup>	<b>Deadline for academic withdrawal</b>	
Week 10: Nov 8 <sup>th</sup> - 12 <sup>th</sup>	1. Global ecology and biomes 2. <b>Ecosystem Ecology I</b> <b>Answers to assignment #7</b>	Ch 52 <b>Ch 55</b> <b>Quiz #8 posted</b> <b>Assignment #8: Ch 52, 56.4</b>
Week 11: Nov 15 <sup>th</sup> – 19 <sup>th</sup>	Ecosystem ecology II <b>Global change biology</b>  <b>Answers to assignment #8</b>	Ch 55 <b>Ch 56, concept 56.4</b> <b>Quiz #9 posted</b> <b>Assignment #9: Ch 55</b>
Week 12: Nov 22 <sup>nd</sup> – 26 <sup>th</sup>	Population Ecology <b>Answers to assignment #9</b>	Ch 53 <b>Quiz #10 posted</b> <b>Assignment #10: Ch 53</b>
Week 13: Nov 29 <sup>th</sup> – Dec 3 <sup>th</sup>	Community Ecology <b>Answers to assignment #10</b>	Ch 54 <b>Quiz #11 posted</b> <b>Assignment #11: Ch 54</b>
Dec 6 <sup>th</sup>	1. Applied ecology and evolution 2. Course review <b>Answers to assignment #11</b>	<b>Quiz #12 posted</b> <b>Quizzes #6-12 due one day before the final exam</b>

## Course/Classroom policies and resources

**Behaviour:** All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications. Concordia students are subject to the [Code of Rights and Responsibilities](#) which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

**Accessibility:** As the instructor of this class, I will strive to make the learning experience as accessible and inclusive as possible, including closed captioning of lecture videos. However, if you have accessibility needs that require academic accommodations, please talk with an advisor from the Access Centre for Students with Disabilities (ACSD) as soon as possible. The ACSD advisor will review your documentation and set an accommodation plan with you. I welcome meeting with you to discuss your accommodations. ACSD Contact information: [acsinfo@concordia.ca](mailto:acsinfo@concordia.ca); 514-848-2424 ext. 3525; SGW Campus, GM 300.

<http://www.concordia.ca/students/accessibility.html>

**Academic Misconduct:** The most common offense under the Academic Code of Conduct is plagiarism, which the Code defines as “the presentation of the work of another person as one’s own or without proper acknowledgement.” This includes material copied word for word from

books, journals, Internet sites, professor's course notes, etc. It refers to material that is paraphrased but closely resembles the original source. It also includes copying the work of a fellow student, such as an answer on a quiz, test, or assignment. It might be a paper purchased from any source. Plagiarism does not refer to words alone –it can refer to copying images, graphs, tables and ideas. "Presentation" is not limited to written work. It includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into any other language and do not cite the source, this is also plagiarism.

**In Simple Words:** Do not copy, paraphrase or translate anything from anywhere without saying where you obtained it (Source: The Academic Integrity Website:

<https://www.concordia.ca/students/academic-integrity.html>)

**Statement on Digital Access and Equality:** Digital devices (like laptops and cell phones) are becoming increasingly important to success in university. In this course, you will need digital devices to access readings, complete and submit written assignments and exams, and discuss with other students. I recognize that some students are unable to afford the cost of purchasing digital devices and that other students rely on older, more problem-prone devices that frequently break down or become unusable. I also recognize that those technology problems can be a significant source of stress for students. Given those challenges, *I encourage students to be aware of the many technology-related resources that Concordia University provides*, including:

- Free Office software and data storage (*Active Concordia students have access to Office 365 Education - a collection of services that allows you to collaborate and share your schoolwork*): <https://www.concordia.ca/it/services/office-365-education.html>
- Access to free support with issues related to Concordia technology (e.g., email, Wi-Fi, printing, device setup, etc.): <https://www.concordia.ca/it/support.html>
- Laptops that students can borrow from the Concordia Library: <https://library.concordia.ca/help/technology/laptops.php>

If you experience a technology-related problem that interferes with your work in this course that cannot be resolved through the above resources, please contact me. This will enable me to assist you in accessing support. *However, please note that you are expected to save backed up versions of your work (drop box or Google Drive work very well and if you need help in learning how to use these, come to my office hours). Thus, requests for accommodation on late or missed assignments due to a crashing computer (or similar) will not be considered.*

## Additional Campus Resources

The resources listed below (and many others) are in place to help you succeed at Concordia. Everyone faces challenges at some point, and often a new environment or difficult and stressful situations (i.e., university) mean we may need additional help. I encourage you to look into the various resources available at Concordia. If you need assistance and cannot find the appropriate resources, please reach out to me, your academic advisor, or another trusted campus advisor.

Resources for health, wellbeing, and student success:

- Student Resources (overview): <http://stc.concordia.ca/>
- New Student Program: <http://newstudent.concordia.ca/>

- Health Services: <https://www.concordia.ca/students/health.html>
- Counselling and Psychological Services: <http://cdev.concordia.ca/>
- Sexual Assault Resource Center: <https://www.concordia.ca/students/sexual-assault.html>
- Indigenous Student Resources: <https://www.concordia.ca/about/indigenous/resources.html>
- International Student Resources: <https://www.concordia.ca/students/international.html>
- Financial Aid and Awards: <http://faao.concordia.ca/main/>

#### *Resources related to academic success and integrity*

- Academic Integrity Website: <http://www.concordia.ca/students/academic-integrity.html>
- Student Advocacy Office: <https://www.concordia.ca/offices/advocacy.html>
- Student Success Centre: <http://www.concordia.ca/students/success.html>
- Student Writing Centre: <http://www.concordia.ca/students/success/learning-support/writing-assistance.html>
- Library and Citation Style Guides: <http://library.concordia.ca/help/howto/citations.html>

#### *Basic Needs*

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students Office or Concordia Student Union for support, and/or access the following resources (*which include free and reduced meals available daily on both the downtown and Loyola campus*):

- Affordable Food Resources at Concordia and in Montreal: <https://www.concordia.ca/students/health/topics/nutrition/affordable-food-resourcesinmontreal.html>
- Concordia Off-Campus Housing and Job Support: <https://www.concordia.ca/students/international/sessions-workshops/housing-support.html>
- Concordia Housing and Job Bank (HOJO): <https://www.csu.qc.ca/services/housing-and-job-bank-hojo/>