

Course ID:	Course Title:	Winter 2024
BIO 301	Principles of Evolution	Prerequisite: BIO 211, BIO 213
		Credits: 3

Class Information		Instructor Information		Important Dates	
Delivery:	In Class	Instructor:	Matthew Morris, PhD	First Day of Class:	January 8
Days:	Wed/Fri	Email:	Matthew.Morris@ambrose.edu	Last Day to Add/Drop:	January 21
Time:	8:15-9:30 am	Phone:	403-410-2000 ext. 6932	Last Day to Withdraw:	March 28
Room:	A1085-S (C) RE132 (T)	Office:	A2158	Last Day to Apply for Coursework Extension:	April 2
Lab/Tutorial:	1 hour/wk Mon, 3:30-4:30 pm	Office Hours:	Wed/Fri 9:30-12	Last Day of Class:	April 12
Final Exam:	Fri Apr 19 9 am -12 pm A1085-1				

Important Dates and Information

For a list of all important dates and information regarding participating in classes at Ambrose University, please refer to the Academic Calendar at <https://ambrose.edu/academic-calendar>.

Course Description

An introduction to the evolutionary processes that shape variation within and between populations and species. Topics include heredity, mutation, genetic drift, natural selection and adaptation, sexual selection, speciation, macroevolution, and implications for conservation and medicine.

Expected Learning Outcomes

1. Gain a deep understanding of and appreciation for the natural world and the human species as understood through an evolutionary lens.
2. Understand the processes (e.g. natural selection, non-random mating, genetic drift, mutation, gene flow) by which populations evolve, including population genetic models of evolution.
3. Contrast artificial, natural, and sexual selection, and adaptive and non-adaptive evolution.

4. Assess evidences for evolution from the fossil record, genome scans, and contemporary observations.
5. Describe different biological models for the origins of life and species.
6. Critically assess common misunderstandings of evolution.

Textbooks

Zimmer C (2016) *The Tangled Bank: An Introduction to Evolution*. 2nd edition. Macmillan.

Additional readings may be provided throughout the semester.

Course Schedule

Date	Topic	Text Chapters	Due dates
Jan 10	Defining evolution	1: Walking Whales	
Jan 12	Historical context	2: Before and After Darwin	
Jan 17	Phenotypic variation		Chapters 1 and 2
Jan 19	Raw material	5: Evolution's Raw Materials	
Jan 24	Heritability	Assigned reading	Chapter 5
Jan 26	Artificial selection		
Jan 31	Natural selection	6: Ways of Change Conner and Hartl Chapter 6	
Feb 2	"Forces" of evolution I: HWE, inbreeding		
Feb 7	"Forces" of evolution II: Mutation and Selection		Chapter 6
Feb 9	"Forces" of evolution III: Gene flow and Drift	Zimmer reading	
Feb 14	Adaptation	8: Adaptation	
Feb 16	Speciation	10: Darwin's First Question	
Feb 21	READING BREAK		
Feb 23	READING BREAK		
Feb 28	Speciation		Chapters 8 and 10
Mar 1	Coevolution	12: Intimate Partnerships	
Mar 6	Human-mediated evolution		Chapter 12
Mar 8	Sexual selection	9: Sex and Family	
Mar 13	Deep time	3: What the Rocks Say	Chapter 9
Mar 15	Tree thinking	4: The Tree of Life	
Mar 20	Molecular evolution	7: Molecular Evolution	
Mar 22	LUCA		Chapters 3, 4 and 7
Mar 27	Macroevolution	11: Macroevolution	
Mar 29	Good Friday		
April 3	Conservation		Chapter 11
April 5	Human evolution I	14: A New Kind of Ape	Term paper due
April 10	Human evolution II		Chapter 14
April 12	TBD		Bonus chapter 15

Textbook chapters are based on the second edition. The first edition has different chapters and will not be as useful.

Tutorials

Date	Tutorial	Due date	Value (%)
Jan 15	Evidences for Evolution	Jan 22	3
Jan 22	Attack of the Clones	Jan 29	3
Jan 29	Artificial Selection	Feb 5	3
Feb 5	Natural Selection	Feb 12	3
Feb 12	HWE	Feb 16	3
Feb 19	Reading week		
Feb 26	Midterm		15
Mar 4	Paper Discussions	March 11	3
Mar 11	Deep Time	March 18	3
Mar 18	Tree Thinking	March 25	3
Mar 25	Molecular Phylogenies	April 8	3
April 1	Easter		
April 8	Misconceptions/Q & A	<i>Your Inner Fish</i> due April 8	3

Requirements:

Midterm – 15%

Final – 30%

Textbook review – 10%

Tutorial assignments – 30%

Paper – 15%

This course consists of 2.5 hours of lectures per week. The midterm and final exam will be a combination of multiple choice questions, as well as short and long answer questions. While most questions will be based on lecture material, the textbook reading will absolutely help in the understanding of this material.

Brief (one page) summaries of **ten of fifteen** textbook chapters will be handed in. **See schedule above.** Additional chapter summaries will be counted as bonus on the final.

Tutorials will involve a mixture of paper discussions, hands-on simulations, and practice problems. The midterm will occur during tutorial time, and will comprise 60 minutes. Each tutorial will be accompanied by homework assignments that are to be done independently.

One research paper will be written over the course of the semester, examining what is known about the evolution of a particular complex adaptation. Evidences from the fossil record, phylogenetics, experiments, and/or comparative DNA sequencing will be considered.

Some sort of computer will be required for this course. If time permits, towards the end of the semester we may do sequence alignments using MegaX, a free software package available at <https://www.megasoftware.net/>

Attendance:

While attendance at lectures is not mandatory, it will help ensure success on course exams and assignments, and missed quizzes cannot be taken later. Attendance at laboratory sessions is mandatory, even when those labs are virtual. Lab reports will not be accepted unless the lab has been attended or exceptions have been made with the instructor.

Grade Summary:

The available letters for course grades are as follows:

Grade	Percentage	Interpretation	Grade Points
A+	96-100	Excellent	4.00
A	92-96		4.00
A-	88-92		3.70
B+	83-88	Good	3.30
B	78-83		3.00
B-	73-78		2.70
C+	68-73	Satisfactory	2.30
C	64-68		2.00
C-	60-64		1.70
D+	55-60	Poor	1.30
D	50-55	Minimal Pass	1.0
F	<50	Failure	0.00
P		Pass	No Grade Points

Because of the nature of the Alpha 4.00 system, there can be no uniform University-wide conversion scale. The relationship between raw scores (e.g. percentages) and the resultant letter grade will depend on the nature of the course and the instructor's assessment of the level of each class, compared to similar classes taught previously.

Please note that final grades will be available on student registration system. Printed grade sheets are not mailed out.

Other:

Late assignment policies

Quizzes or tutorial assignments cannot be submitted late without cause and approval from the professor. Tutorial assignments **are due at the beginning of tutorial**; anything after the start of the tutorial will be considered late. The penalty for late homework or tutorial assignments are as follows:

- 5%/day for late assignments that have been communicated to the professor ahead of time.
- 10%/day for late assignments if the professor has to track you down to find out what is going on.
- 0% on any assignments passed in one week after the due date, unless otherwise stated by the instructor. *These assignments will still be "graded" so that you can have feedback before the exam, even if your official grade is 0.*

If your name is not on the assignment, it will not be graded and you will receive a grade of 0 for failing to submit an assignment.

Missed final exams, without cause, cannot be made up.

Plagiarism policy

See below for Ambrose's statement defining plagiarism and outlining its consequences. In brief, it is your responsibility as a citizen of Ambrose to be aware of the policies of Ambrose and abide by them. Ignorance is no excuse. Plagiarism will not be tolerated.

Examples of plagiarism include, but are not limited, to:

1. Copying an assignment from someone else and submitting it as your own work.
2. Working with a friend and writing down identical answers, whether you understand the content or not, and submitting the assignments separately.
3. Quoting directly from a source without supplying quotation marks or a citation.
4. Quoting directly from a source without supplying quotation marks, even if it is referenced.
5. Copying nearly word-for-word from a source, changing only the occasional word, without providing quotation marks, even if it is referenced.
6. Submitting an assignment in which >30% of the content is properly quoted; that is, at least 70% of the words in an assignment need to be your own. A general rule of thumb: for every line quoted, there should be three lines of your own material explaining that quote.
7. Submitting the same or similar assignment for more than one class, or more than one iteration of the same class.
8. Not citing illustrations used in a paper.

Penalties for plagiarism

Offence	Consequence
First	0% on paper, on chance to redo; report on plagiarism filed with the registrar
Second	F in course
Third	F in course and recommendation to registrar for expulsion

Note that Ambrose has an appeals process in place if you feel that allegations of plagiarism are unfounded; these are for final marks only, and not for individual assignments.

Note that my record of a student's past plagiarism does **not** reset with each semester.

Classroom Etiquette:

It is expected that students will take an active role in the learning process. This includes: (a) regular class and lab attendance, (b) reading course material in advance of class or labs, and (c) engaging in discussions during class or labs.

In respect to the professor and to your fellow students, we ask that you:

- a) Turn your phone off during class and that you don't use it for texting during lecture or lab;

- b) Not have conversations with the people beside you during lecture – it is very distracting to the people around you;
- c) Use your laptops for lecture material and assignments only – that you are not using the internet or Facebook during class time;
- d) Arrive to lecture and lab on time;
- e) Don't listen to music in class or lab.

These will help to maximize the learning experience for you and your fellow students (and will keep your professor in a good mood).

Ambrose University Important Policies & Procedures:

Registration

Registration is the process of selecting and enrolling in classes for upcoming semesters. Only students who are registered will be permitted to attend class and receive a grade for the course. You are responsible for ensuring that the courses you take are appropriate for your program, that they do not have any scheduling conflicts, that they have the necessary prerequisites and that they meet all degree requirements.

Withdrawal From A Course

Prior to the Add/Drop deadline: through the student registration system whereby course(s) will be removed with no academic or financial penalty. After the Add/Drop deadline and until the Withdrawal deadline: through submission of the 'Withdrawal from Course' form whereby course(s) will remain on the permanent academic record/transcript with the symbol 'W'. (See ambrose.edu/registrar/request-forms.) Students who withdraw from more than 30 credits attempted at Ambrose University will be required to withdraw from their program. Students considering withdrawing from courses are encouraged to discuss with their Faculty Advisor and/or the Office of the Registrar questions relating to their withdrawal decision specifically relating to financial assistance, study permit requirements, prerequisites for subsequent courses, readmission, and/or graduation timeline. Students who do not formally withdraw from a course are still considered registered in the course, even if they are no longer attending classes. In this case, students will be assigned a grade based on coursework completed as per the course syllabus and are responsible to pay the tuition and fees assessed for the course. Under extenuating circumstances, students may request from the Office of the Registrar a course(s) withdrawal after the Withdrawal deadline and until the last day of classes. Extenuating circumstances typically consider situations such as medical emergencies, compassionate grounds, or unforeseen conditions/situations beyond the students' control that arise after the start of the semester and are considered on a case-by-case basis. Supporting documentation from a physician or Registered Health Professional must accompany this request.

Coursework Extensions

Should a request for a time extension on coursework exceed the end of the term, a *Coursework Extension Application* must be completed and submitted to the Office of the Registrar. The extension (if granted) will be recorded on the student record. Extensions are granted at the discretion of the instructor and registrar. If granted, time extensions do not excuse you from a final examination where one has been scheduled for the course. More conditions apply.

Exam Scheduling

Students who find a conflict in their exam schedule must submit a *Revised Final Exam Time Application* to the Office of the Registrar by the deadline noted in the Academic Calendar. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; or 2) the scheduled final examination slot results in three consecutive examination periods. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

Communication

Your Ambrose email account is the University's primary and official mode of communication with you. Information delivered to your Ambrose email is considered official notification. Ambrose University is not responsible for your failure to receive important information delivered to your Ambrose email.

Lecture Recording

The recording of lectures or any other classroom academic activity, other than an audio recording as an accommodation, is prohibited except at the discretion of the instructor. Any use other than that agreed upon with the instructor constitutes academic misconduct and may result in suspension or expulsion. Permission to allow a lecture recording is not a transfer of any copyrights, so such recordings may be used only for individual or group study with other students enrolled in the same class and may not be reproduced, transferred, distributed or displayed in any public or commercial manner. Student must destroy recordings in any, and all formats at the end of the semester in which they are enrolled in the class. All students recording lectures, must sign the Permission Form to audio record lectures which is available through the Office of the Registrar.

Standards of Behaviour in the Classroom Setting

Learning is an active and interactive process, a joint venture between student and instructor and between student and student. Some topics covered within a class may lead to strong reactions and opinions. It is important that Students understand that they are entitled to hold contradictory beliefs and that they should be encouraged to engage with these topics in a critical manner. Committing to this type of "active learning" significantly increases the learning experience for both teacher and student, and reflects the Christian imperative to pursue truth, which lies at the heart of the Ambrose educational experience. However, active discussion of controversial topics will be undertaken with respect and empathy, which are the foundations of civil discourse in the Classroom Setting. Primary responsibility for managing the classroom rests with the instructor. The instructor may direct a student to leave the class if the student engages in any behaviour that disrupts the classroom setting. If necessary, Ambrose security will be contacted to escort the student from class.

Academic Integrity

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to acknowledge to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university. Students are expected to be familiar with the policies in the current Academic Calendar that

deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.

Academic Policies

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Academic Calendar. The academic calendar can be found at <https://ambrose.edu/academics/academic-calendar>

Privacy

Personal information (information about an individual that may be used to identify that individual) may be required as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Academic Success and Supports

Accessibility Services

Academic accommodation is provided to Ambrose students with disabilities in accordance with the Alberta Human Rights Act and the Canadian Charter of Rights and Freedoms. Provision of academic accommodation does not lower the academic standards of the university nor remove the need for evaluation and the need to meet essential learning outcomes. Reasonable accommodations are tailored to the individual student, are flexible, and are determined by considering the barriers within the unique environment of a postsecondary institution. It can take time to organize academic accommodations and funding for disability-related services. Students with a disability who wish to have an academic accommodation are encouraged to contact Accessibility Services as early as possible to ensure appropriate planning for any needs that may include accommodations. Staff can then meet with students to determine areas to facilitate success, and if accommodations are required, ensure those accommodations are put in place by working with faculty.

Learning Services

Learning Services provides support with

- **research and communication skills** (e.g., writing a paper, researching, giving a presentation), and
- **subject-specific skills** (e.g., solving a chemistry problem, reconciling a general ledger, understanding a philosophical argument).

We offer workshops, one-to-one tutoring, and more, and all of our services are **free** to students currently enrolled at Ambrose University. To learn more, please visit <https://ambrose.edu/sas/learning-services>.

Mental Health Support

All of us need a support system. We encourage students to build mental health supports and to reach out when help is needed.

On Campus:

- Counselling Services: ambrose.edu/counselling

- For immediate crisis support, there are staff on campus who are trained in Suicide Intervention Skills and can help you access mental health support. See <https://ambrose.edu/student-life/crissupport> for a list of staff members.
- For additional wellness resources go to the Ambrose wellness page: <https://ambrose.edu/wellness>

Off Campus:

- Distress Centre - 403-266-4357
- Alberta Mental Health Helpline - 1-877-303-2642 (Toll free)
- Sheldon Chumir Health Care Centre - 403-955-6200
- Emergency - 911

Sexual Violence Support

We are committed to supporting students who have experienced gender based sexual violence in the past or while at Ambrose. Many of the staff, faculty, and student leaders have received Sexual Violence Response to Disclosure training. We will support you and help you find the resources you need and you can access information about reporting. Information about the Sexual Violence policy and on and off campus supports can be found on our website— ambrose.edu/sexual-violence-response-and-awareness.

Off Campus:

- Alberta's Oneline for Sexual Violence - 1-866-403-8000 call or text
- Clinic: Sheldon Chumir Health Centre - 403-955-6200
- Calgary Communities Against Sexual Abuse - 403-237-5888
- Chat: www.calgarycasa.com

Note: Students are strongly advised to retain this syllabus for their records.