

<b>Course ID:</b>	<b>Course Title:</b>	<b>Winter 2022</b>
BIO 301	Principles of Evolution	<b>Prerequisite: BIO 211, BIO 213</b>
		<b>Credits: 3</b>

Class Information		Instructor Information		Important Dates	
<b>Delivery:</b>	In Class	<b>Instructor:</b>	Matthew Morris, PhD, MSc, BSc, BRE	<b>First Day of Classes:</b>	January 10, 2022
<b>Days:</b>	Tues/Thurs	<b>Email:</b>	<a href="mailto:Matthew.Morris@ambrose.edu">Matthew.Morris@ambrose.edu</a>	<b>Last Day to Add/Drop:</b>	January 23, 2022
<b>Time:</b>	3:15-4:30	<b>Phone:</b>	403-410-2000 ext. 6932	<b>Last Day to Withdraw:</b>	March 18, 2022
<b>Room:</b>	A2212	<b>Office:</b>	A2158	<b>Last Day to Apply for Extension:</b>	March 28, 2022
<b>Lab/ Tutorial:</b>	1 hour tutorials Mon, 2:45-3:45, A2210	<b>Office Hours:</b>		<b>Last Day of Classes:</b>	April 14, 2022
<b>Final Exam:</b>	Office of the Registrar will publish Final Exam Schedule				

### 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) Evolution: Making sense of life. 2<sup>nd</sup> edition. Roberts and Company: CO.

Additional readings will be provided throughout the semester.

**Course Schedule**

Date	Topic	Text Chapters	Due dates
Jan 11	Defining evolution	1: Walking Whales	
Jan 13	Historical context	2: Before and After Darwin	
Jan 18	Phenotypic variation		Chapters 1 and 2
Jan 20	Raw material	5: Evolution’s Raw Materials	
Jan 25	Heritability	Assigned reading	Chapter 5
Jan 27	Artificial selection		
Feb 1	Natural selection	6: Ways of Change Conner and Hartl Chapter 6	
Feb 3	“Forces” of evolution I: HWE, inbreeding	Assigned readings	
Feb 8	“Forces” of evolution II: Mutation and Drift	Assigned readings	Chapter 6
Feb 10	“Forces” of evolution III: Gene flow and Selection	Zimmer reading	
Feb 15	Adaptation	8: Adaptation	
Feb 17	Sexual selection	9: Sex and family	
Feb 22	READING BREAK		
Feb 24	READING BREAK		
Mar 1	Population differentiation		Chapters 8 and 9
Mar 3	Models of speciation	10: Darwin’s First Question	
Mar 8	Coevolution	12: Intimate partnerships	Chapter 10
Mar 10	Deep time	3: What the Rocks Say	
Mar 15	Phylogenetics	4: The Tree of Life	Chapters 12 and 3
Mar 17	Molecular evolution	7: Molecular Evolution	
Mar 22	Macroevolution	11: Macroevolution	Chapters 4 and 7
Mar 24	Extinction		
Mar 29	Human evolution I	14: A New Kind of Ape	Chapter 11
Mar 31	Human evolution II		<b>Adaptation paper due</b>
April 5	Evolutionary medicine	15: Evolutionary Medicine	Chapter 14
April 7	Human-mediated evolution		
April 12	TBA		Chapter 15
April 14	TBA		

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 17	Evidences for evolution	Jan 24	3
Jan 24	Variance	Jan 31	3
Jan 31	Heritability/Artificial selection	Feb 7	3
Feb 7	Measuring selection	Feb 14	3
Feb 14	HWE	Feb 17	3
Feb 21	<b>Reading week</b>		
Feb 28	Midterm		20
Mar 7	Evolution of populations	March 14	3
Mar 14	Deep time	March 21	3
Mar 21	Tree-thinking	March 28	3
Mar 28	SARS-CoV-2	April 4	3
April 4	Human evolution	April 11	3
April 11	Misconceptions/Q & A		

### Requirements:

Midterm – 20%

Final – 30%

Textbook review – 10%

Tutorial assignments – 30%

Paper – 10%

This course consists of 3 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 with Zoom capabilities 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. Attendance at tutorials is mandatory – attendance will be taken. Due to the ongoing Covid pandemic, attendance may be held virtually for tutorials when on-campus meetings are not permitted (e.g. until Jan 31 for now). Missed tutorials cannot be made up. Missing more than two tutorials will result in failure of the course.

## 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 lab assignments cannot be submitted late without cause and approval from the professor. Lab assignments **are due at the beginning of lab**; anything after the start of the lab will be considered late. The penalty for late homework or lab 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**

<b>Offence</b>	<b>Consequence</b>
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 Information:

### Communication

All students have received an Ambrose e-mail account upon registration. It is the student's responsibility to check this account regularly as the Ambrose email system will be the professor's instrument for notifying students of important matters (cancelled class sessions, extensions, requested appointments, etc.) between class sessions.

### Exam Scheduling

Students who find a conflict in their exam schedule must submit a Revised Examination Request form to the Registrar's Office by the deadline date; please consult the Academic Calendar. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; 2) the student has three final exams within three consecutive exam time blocks; 3) the scheduled final exam slot conflicts with an exam at another institution; 4) extenuating circumstances. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

### 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. Please refer to your professor regarding their electronic etiquette expectations.

### 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/content/academic-calendar-2>.

### 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](mailto:privacy@ambrose.edu).

### 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 are normally granted for 30 days beyond the last day of the term.

Normally, Course Extension Applications will be considered only when all of the following conditions are met:

- the quality of prior course work has been satisfactory;
- circumstances beyond your control, such as an extended illness or death of a family member, make it impossible for you to complete the course work on time; and
- you submit *Coursework Extension Application* to the Office of the Registrar on or before the deadline specified in the Academic Schedule.

If granted, time extensions do not excuse you from a final examination where one has been scheduled for the course.

A temporary grade of TX will be assigned until a final grade is submitted in accordance with the new deadline. A final grade of F will apply to:

- all course work submitted after the end of the semester unless a coursework extension has been granted; and all course work submitted after the revised due date provided by an approved extension to coursework.

## 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.

### Ambrose Writing Services

Ambrose Writing services provides academic support in the four foundational literacy skills—listening, speaking, reading, and writing. It also assists students with critical thinking and the research process. Throughout the academic year, students can meet with a writing tutor for personalized support, or they can attend a variety of workshops offered by Academic Success. These services are free to students enrolled at Ambrose University. Academic Success serves all students in all disciplines and at all levels, from history to biology and from theatre to theology. To learn more, please visit <https://ambrose.edu/writingcentre>

### Ambrose Tutoring Services

Ambrose Tutoring Services provides support in specific disciplinary knowledge, especially in high-demand areas such as chemistry, philosophy, math and statistics, and religious studies. These tutors also coach students in general study skills, including listening and note-taking. During the academic year, Ambrose Tutoring Services offers drop-in tutoring for courses with high demand; for other courses, students can book a one-to-one appointment with a tutor in their discipline. These services are free to students enrolled at Ambrose University. To learn more, please visit <https://ambrose.edu/tutoring>.

### 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](http://ambrose.edu/counselling)
- Peer Supportive Listening: One-to-one support in Student Life office. Hours posted at [ambrose.edu/wellness](http://ambrose.edu/wellness).
- For immediate crisis support, there are staff on campus who are trained in Suicide Intervention and Mental Health First Aid. See [ambrose.edu/crisissupport](http://ambrose.edu/crisissupport) for a list of staff members.

#### Off Campus:

- Distress Centre - 403-266-4357
- Sheldon Chumir Health Care Centre - 403-955-6200
- Emergency - 911

### Sexual Violence Support

All staff, faculty, and Residence student leaders have received *Sexual Violence Response to Disclosure* training. We will support you and help you find the resources you need. There is a website with on and off campus supports – [ambrose.edu/sexual-violence-response-and-awareness](http://ambrose.edu/sexual-violence-response-and-awareness).

#### Off Campus:

- Clinic: Sheldon Chumir Health Centre - 403-955-6200
- Calgary Communities Against Sexual Abuse - 403-237-5888

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