

Course ID:	Course Title:	Fall 2022
BIO 211	Principles of Genetics	Prerequisite: BIO 131
		Credits: 3

Class Information		Instructor Information		Important Dates	
Delivery:	In Class	Instructor:	Matthew Morris, PhD, MSc, BSc (Hnrs Co-op), BRE	First Day of Class:	Sept 7
Days:	W/F	Email:	Matthew.Morris@ambrose.edu	Last Day to Add/Drop:	Sept 18
Time:	9:45-11:00	Phone:	403-410-2000 ext 6932	Last Day to Withdraw:	Nov 21
Room:	L2084	Office:	A2158	Last Day to Apply for Coursework Extension:	Nov 23
Lab/Tutorial:	Monday 12:00-3:00 A2145	Office Hours:	Wed 1:00-3:00	Last Day of Class:	Dec 12
Final Exam:	Fri, Dec 16 9 am – noon L2084		Matthew Morris, PhD, MSc, BSc (Hnrs Co-op), BRE		

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

This course examines the principles of heredity, Mendelian laws, as well as basic concepts of gene structure and function, gene regulation and genetic recombination. Principles from prokaryotes, eukaryotes and viruses will be explored. The accompanying laboratory component contains experiments and exercises to illustrate key genetic principles and molecular genetic techniques.

Learning Outcomes

This course will cover classical (Mendelian) and modern (molecular) genetics. Students should come out of this course being able to:

1. Understand

- a. key experiments from the history of genetics, and their implications
- b. the connection between patterns of Mendelian inheritance and the molecular structure of DNA
- c. the molecular characteristics of DNA/RNA and their relationship to the phenotype as mediated through replication fidelity, transcription, translation, epigenetics, and DNA damage/repair

2. Assess

- a. ways in which the scientific discipline of genetics has both enhanced and diminished human flourishing
- b. similarities and differences between the genomes (and associated properties) of prokaryotes, eukaryotes, mitochondria, and viruses

3. Research

- a. Mendelian patterns of inheritance for particular traits using Punnett squares, pedigrees, and associated statistics (e.g. Chi-square tests), and modify expectations using information from population genetics
- b. use online tools to explore genomes and identify coding and non-coding regions of genes
- c. techniques in a laboratory setting, including pipetting, DNA extraction, Polymerase Chain Reaction, and gel electrophoresis

4. Communicate

- a. knowledge through appropriate assessment tools (e.g. homework assignments, midterm, final exam, laboratory reports)
- b. a mini-lecture on a topic related to the field of genetics

5. Form character

- a. through developing scientific disciplines (e.g. numeracy, critical thinking, observation, recording and reporting of results)
- b. through articulating touch-points between the field of genetics and the Christian faith
- c. developing empathy for those with genotype-environment mismatches that diminish their flourishing

Textbooks

Required. Pierce BA (2020) *Genetics: A Conceptual Approach, 7th ed.* W.H. Freeman and Co.: NY. **Ebook version with Achieve.** Older versions of the textbook will not work for this class.

Covid and the syllabus

This syllabus, including the schedule and grading scheme, must be considered tentative. Updated syllabi will be made available as needed – particularly if the university gets temporarily moved online due to Covid.

BIO 211 lectures and labs are currently designated as “in-class”, meaning that students are expected to be physically present for lecture, lab, and exam times. This could change as Covid circumstances change. The professor will post over Moodle mail whether a particular lecture/lab or the remainder of the semester will be moving to an online format. Be in constant communication with your professor, and be sure to check both your Ambrose email address and your Moodle course announcements page. The lecture Moodle page will be the primary location for announcements pertaining to lecture or lab changes; the lab Moodle page will only be used to post lab assignments.

Course Schedule – colour-coded by homework content

Week	Topic	Ch: pg	Due
Sep 7	Introduction	1: all	
Sep 9	Cell cycle	2: all	
Sep 14	Classic Mendelian genetics	3: all	
Sep 16	Chromosomal theory of inheritance		
Sep 21	Sex-linked inheritance and pedigree analysis	4: all 6: 6.1, 6.2	Homework 1
Sep 23	DNA	10: all	
Sep 28	DNA replication	12: 12.1, 12.2, 12.3	
Sept 30	TRUTH AND RECONCILIATION – NO CLASSES		
Oct 5	DEEPER LIFE – NO CLASSES		
Oct 7	Linkage	7: 7.1, 7.2, 7.3	Homework 2
Oct 12	Allelic and genic interactions	5: all	
Oct 14	RNA and transcription	13: 13.1, 13.2, 13.3	
Oct 19	Using replication: PCR and electrophoresis	19: 19.3	
Oct 21	Translation	15: all	
Oct 26	Mutations and DNA repair	18: all but 18.4	Homework 3
Oct 28	Mutations and DNA repair		
Oct 31	MIDTERM up to and including translation, in lab		
Nov 2	DNA sequencing	19: 19.2, 19.5	
Nov 4	Chromosomal rearrangements and polyploidy	8: all	
Nov 9	Reading break		
Nov 11	Reading break		
Nov 16	Prokaryotic genome	9: 9.1, 9.2, 9.3	

Nov 18	Eukaryotic genome	11: 11.1, 11.2, 11.3 12: 12.4 13: 13.4 14: all	Homework 4
Nov 23	Introduction to gene expression	16: all	
Nov 25	Epigenetics	17: all 21: all	
Nov 30	Population genetics	25: 25.1, 25.2	
Dec 2	Mitochondrial genome	5: 5.3 11: 11.4	
Dec 7	Transposable elements	18: 18.4	Homework 5
Dec 9	What is a gene?		

Lab Schedule

Week	Topic	Lecture based on	Due date	Value (%)
Sept 12	Chi-square tests		End of lab	2
Sept 19	Mendelian inheritance in corn	Mendelian genetics	End of lab	3
Sept 26	Meiosis	Chromosomal theory	Prelab: Start of lab Assignment: Oct 3	1 2
Oct 3	Fruit flies I	Sex-linked traits	End of lab	3
Oct 10	THANKSGIVING			
Oct 17	Fruit flies II/Complications to Patterns of Mendelian Inheritance	Linkage, sex-linkage, interactions	Prelab: Start of lab Assignment: End of lab	1 2
Oct 24	Fruit flies III	Sex-linked traits	End of lab	3
Oct 31	Midterm			20
Nov 7	READING BREAK			
Nov 14	DNA extraction and PCR	DNA replication and PCR	Nov 21	3
Nov 21	Gel electrophoresis	DNA replication and PCR	Nov 28	3
Nov 28	Human genome		End of lab	2
Dec 5	Mini Lecture			5
Dec 12	Review			

Requirements:

Mark distribution:

Homework assignments: 3% each, to 15%

Homework 1

Homework 2

Homework 3

Homework 4

Homework 5

Midterm: 20%

Final: 30%

Lab: 35%

Chi-squared tests: 2%

Mendelian genetics of corn: 3%

Meiosis: 2%

Prelab: 1%

Fruit flies:

Part 1: 3%

Part 3: 3%

Complications to patterns of Mendelian inheritance: 2%

Prelab: 1%

DNA extraction and PCR: 3%

Gel electrophoresis: 3%

Human genome: 2%

Mini-lectures on human genome: 5%

Lab etiquette: 5%

Homework assignments

The purchase of your textbook comes with an Achieve account. There are five homework assignments posted to Moodle – these contain a combination of practice calculations in hard copy format, as well as directions on which Achieve homework or assessments are required. These Achieve assignments can be found under Course Content.

Collectively, these exercises sum to 15% of your overall grade.

They are available now and are due at the start of class on the date assigned (see due dates in the table above).

Some optional exercise will be provided throughout the semester, especially prior to the midterm and final exam. It is strongly recommended that students do these optional exercises, as they will better prepare for testing.

Exams

The midterm will be completed during lab session over the full three hours. If you are with accessibility it is your responsibility to communicate with the instructor and the accessibility office about midterm accommodations. If Covid strikes, midterms may be moved to Moodle.

Lab content is fair game for midterms.

The final exam is comprehensive and cumulative, and will be scheduled by the office of the Registrar.

Lab assignments

Laboratory assignments will involve individual or group work, specified on the assignment. Group work will require only one submission per group; grades will be given to those named on the assignment. Labs are typically due at the start of the lab period.

Attendance

Attendance to lectures is not mandatory, but in my experience students who do not come to lecture do not perform well. Lectures will not be provided over Zoom unless there is a change in university policy as a response to some change to the pandemic. If you miss lectures, it is your responsibility to review the PPT slides provided and talk to your peers.

Attendance **to laboratories is mandatory**. Missing more than two lab periods results in an automatic F for the course.

Late assignment policies

Homework or lab assignments cannot be submitted late without cause and approval from the professor. Homework assigned during lecture is **due at the start of lecture** for which it is due; anything after the start of lecture will be considered late. Lab assignments not due at the end of the lab period in which the work is done **are due at the beginning of the next lab period**; anything after the start of the lab will be considered late. The penalty for late homework or lab assignments are as follows:

Issue	Communicated to professor or lab instructor in advance?	Penalty
Late by 5 min – 7 days	Yes	5% deducted per day
Late by 5 min – 7 days	No	10% deducted per day
Late by >7 days	-	0 on assignment
No name on assignment	-	0 on assignment

Assignments officially receiving a grade of 0 as a penalty will still be “graded” so that you can have feedback before the exam, even if your official grade is 0.

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

Plagiarism policy

Consult the Academic Calendar for Ambrose’s position on plagiarism and 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 assignment, no chance to redo; report on academic misconduct filed with the registrar
Second	F in course; report on academic misconduct filed with the registrar
Third	F in course and recommendation to registrar for expulsion; report on academic misconduct filed with the registrar

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.

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		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.

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 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.

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/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.

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. 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.

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

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/sas/writing-services>

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
- Peer Supportive Listening: One-to-one support in Student Life office. Hours posted at ambrose.edu/wellness.
- For immediate crisis support, there are staff on campus who are trained in Suicide Intervention and Mental Health First Aid. See <https://ambrose.edu/student-life/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.

Off Campus:

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