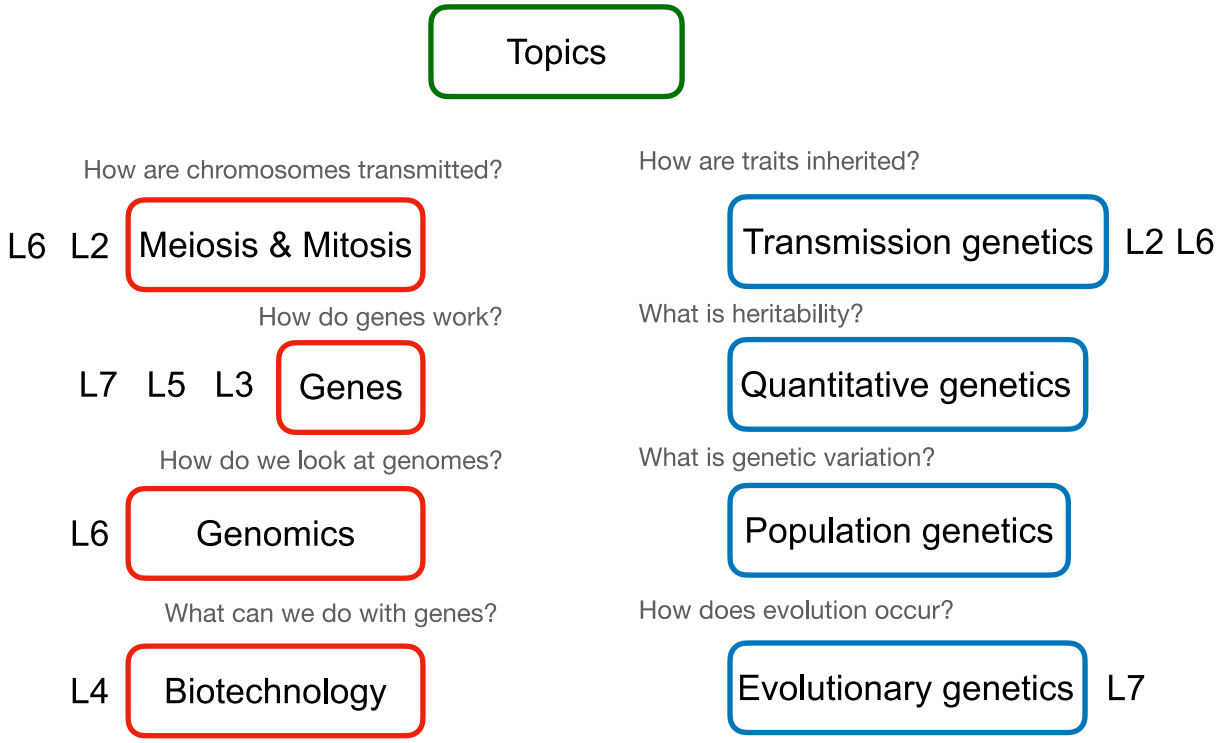
Principles of Genetics – BIOL 230 – A01

Course Outline, Spring 2025

General Course Information

Welcome! A fundamental truth in the world is that offspring look like their parents but are not perfect copies. Why is this the case? This course explores how traits are inherited, focusing on the quantitative and molecular basis of inheritance. We'll learn about genomes, genes and how they make us who we are. The course will be taught synchronously and 'face-to-face' and will be complemented by a lab section.



Intended Lecture Learning Outcomes

-You will understand the function of meiosis and mitosis and implications for trait inheritance.

-You will understand how and why mendelian traits are inherited in crosses.

-You will understand what genes are, and how they are regulated and expressed.

-You will be able to explain how common molecular genetic techniques work.

-You will be familiar with modern genomic technologies.

-You will be able to define and calculate multiple types of heritability.

-You will understand how Hardy-Weinberg Equilibrium is calculated and what it can be used for.

-You will understand the concepts of orthology and how to read a phylogenetic tree.

Intended Lab Learning Outcomes

We have carefully selected lab activities for three purposes: 1) to provide a hands-on opportunity for you to grasp genetic theories through practice, 2) to provide opportunities to successively expand on your newly obtained laboratory skills, and 3) to become proficient in the use of computing tools used in genetic research labs.

Following a research project that includes an evaluation of current research of a gene of choice, you will be able to communicate your research in a presentation format. You will correctly distinguish the components of precise and clear scientific communication through writing and presenting your research.

Upon completion of the lab course, it is expected that you will be proficient at the use of several lab techniques and equipment.

Lab techniques –DNA extraction, polymerase chain reaction, gel electrophoresis, bioinformatic tools

Lab equipment – such as micropipettes, centrifuges, nano-spectrophotometers, electrophoresis equipment and imaging equipment

Lecture Contact Hours & Delivery of Course Materials

Tuesday, Wednesday & Friday @ Bob Wright Centre B150

10:30am-11:20am

NOTE: ***Enrolment/attendance in a laboratory section is mandatory***

Prerequisite: BIOL225
Pre- or corequisite: CHEM231
If in doubt, contact grego@uvic.ca.

Instructors:

Dr. Greg Owens (grego@uvic.ca)

Kimberley Curry (biologylabs@uvic.ca)

About the Instructors

This course is co-taught by Dr. Greg Owens (Lectures and Course Coordination), and Kimberley Curry (Senior Lab Instructor). Greg is a Vancouver local who did his undergrad education at UVic in the old days. He returned to UVic in 2020 and has been researching evolutionary genomics in a variety of systems. Greg keeps shrimp in his office aquarium. Kim is a Vancouver Island local who did her undergrad education at UVic as well! She returned to UVic in 2007 as the Senior Lab Instructor for several second and third year lab courses. You can find out more about the instructors under 'Course Information' on Brightspace.

Assessment

You will have the opportunity to demonstrate your progress and proficiency through various forms of evaluation, including:

Lecture Component (60%)

Weekly mini-quizzes (8 out of 10 quizzes)	8%
Lecture midterm exam #1	10%
Lecture midterm exam #2	10%
Lecture final exam (cumulative)	32%

Laboratory Component (40%)

Assignments (4 x 6%)	24%
Presentation (course requirement)	6%
Lab exam (course requirement)	10%

To pass the course, students must:

1) Write the final **lecture** exam
2) Meet the minimum **lab** attendance requirement (attend at least 7 of the 9 labs)
3) Complete the **lab** My Gene project
4) Write the practical **lab** exam
5) Complete the **lab** presentation
6) Score a grade of at least 50% in the **Laboratory** component
7) Score a grade of at least 50% in the **Lecture** component

If any of 1 through 5 are not completed, the student will automatically fail the course and receive an "N" ('Incomplete') on their transcript. If a student successfully completes 1 through 5, but is not successful in either 6 or 7, they will receive an "F" on their transcript.

Weekly Quizzes

Each week you will have a quiz on the material from the previous week worth 0.5%. Quizzes will be 3 questions, multiple-choice, open book on Brightspace and **must be completed individually**. Quizzes may be started any time on Friday. Once started you will have one hour (60 minutes) to complete the quiz, although we do not expect it to take the full hour. Quizzes are designed to help prepare you for the midterm and final, where you will face similar questions and have roughly ~2 minutes per question. **You may take the quiz an unlimited number of times on Friday and you will receive your highest achieved grade. At the end of the semester, the lowest two quiz marks will be dropped from your record**. Consequently, we will not be allowing deferred quizzes. If you have a long-term issue that forces you to miss more than two quizzes, please contact the course coordinator (grego@uvic.ca).

Writing Tests and Exams in Biology 230

All lecture tests and exams will be administered online using Brightspace. These assessments will be open book and must be written individually, using a student's own mobile device or home computer, or on computer on campus. The normal lecture hall will be open and available as a

quiet space to write the exam (but you are not required to be there).There are two lecture midterms 1) January 28th and 2) March 4th. Both are during the scheduled lecture timeslot (10:30 am to 11:20 pm). **As an open book exam, you are allowed to use your notes, the lectures or the internet. You are not allowed to communicate with others, or use AI software in the exam.**

Deferred exams are for students who have medical, or unexpected and unavoidable circumstances. Deferred tests are scheduled for the Saturday following the original date (Feb 11th, and Mar 8th), at 9:00am, but be sure to contact the course coordinator (grego@uvic.ca) in advance. In your email, please explain your reason for your request, but you do not need to include medical documentation (i.e. doctor's note).

Required Materials and Technology

1. The Brightspace (BRS) course lecture website: https://bright.uvic.ca/d2l/home/362470 will serve as the primary means of sharing learning resources, so please check this page regularly for important information and announcements. The lab BRS page: https://bright.uvic.ca/d2l/home/393709 will provide all lab related documents, such as TA office hours, assignment submission drop-boxes, etc.
2. Suggested textbook: - 'Genetics Analysis and Principles' by Robert J. Brooker¸ 8th (2023) edition, McGraw- Hill Ed. It is available through the UVic Bookstore. The textbook is not required but can supplement your learning. Previous editions of the textbook are largely the same, but we cannot guarantee that they will cover all of the material in the course.
3. Lecture materials: live lectures will be recorded and will be posted on Brightspace along with electronic (.pdf) versions of the lecture slides. **Do not distribute lecture slides onto the internet.**
4. Lab materials: You are required to have a lab coat and a lab manual, both of which can be purchased from the UVic bookstore.

Additional inquiries and contact/office hours

Lecture content: Office hours will be determined after polling the class. Dr Owens will also generally be available in the hallway outside of the lecture hall after class.

Laboratory content: Office hours will be posted on Brightspace. Inquiries about lab registration should be emailed to biology.reghelp@uvic.ca**.** Lab and non-registration inquiries should be emailed to biologylabs@uvic.ca.

Administrative questions: If you have any administrative related questions, please post your question on Brightspace under 'Administrative Q & A forum'. Those could be questions like 'When do we write quiz 1?' (Hint: often you find the answers to those question in the course outline or on Brightspace)

Scientific questions: if you have any topic related question, please post your question on Brightspace under 'Scientific Q & A forum'. Those could be questions like 'Does the *lacI* gene belong to the lac operon?' This is a great study tool before quizzes/exams!

Lab-specific questions: if you have any questions related to the laboratory content, please post your question on Brightspace under 'Lab Q & A forum'.

Please include "BIOL 230" in the subject line of all e-mail correspondence
We try to get back to you within 48h

Important dates (check your lab manual for assignment due dates)

- Jan 7th Introduction of the course and the team
- Jan 10th First weekly quiz on Brightspace
- Jan 19th Last day for 100% reduction of second term fees
- Jan 22nd Last day for adding courses that begin in the second term
- Jan 28th Midterm #1 online during class time (No quiz this week)
- Feb 1st Deferred midterm #1 online at 9 am
- Feb 9th Last day for 50% reduction of tuition fees for standard courses
- Feb 17-21st reading week, no lectures, no labs
- Mar 4th Midterm #2 online during class time (No quiz this week)
- Mar 8th Deferred midterm #2 online at 9 am
- Apr 3rd Last lecture for BIOL 230
- Apr 4th Final weekly quiz for BIOL 230
- Apr 7-25th Final exam window

Important Lab Specific Information:

Lab safety

You are expected to wear closed-toe shoes, a lab coat, and lab safety glasses.

Lab schedule

You must enrol in and attend a lab section in this course.

Labs will begin the week of Jan 13th in either Cunningham 102 or 116. Check your schedule to find out what lab you will be in.

Lab Policies

Detailed lab policies are outlined in the lab manual. Here is a summary:

Grade challenges – you have one week to request a remark of lab work.

Late assignments – are not accepted and there will be no deferrals for any missed lab work or summative assessments. See lab concession and accommodation procedures on the

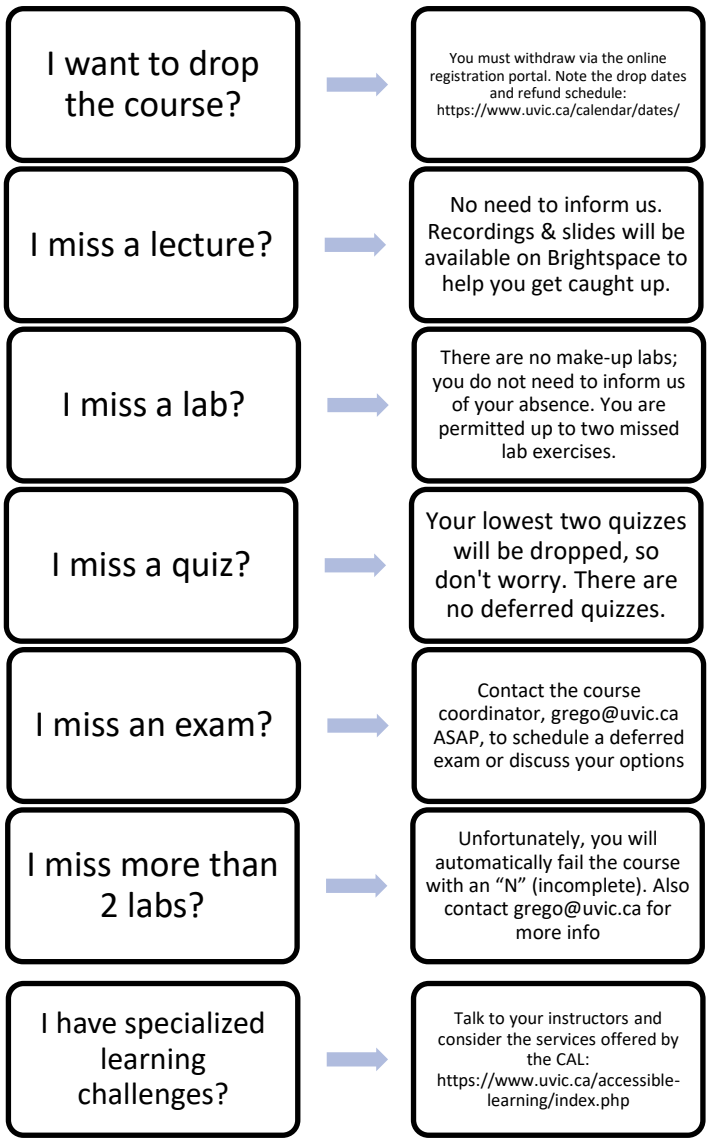
course website. Details and instructions for assignments will be discussed in lab and will be posted on our BRS site. *Assignments that are late will receive a mark of 0.0 (Please refer to UVic Policies and Procedures). *e.g.,* there are no extensions or late marks.

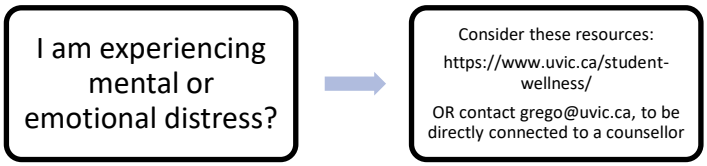
Plagiarism – zero tolerance for plagiarism in any form. Any words or ideas that are not your own MUST be acknowledged. Plagiarism includes "recycling" work from other classes, and it includes copying from online sources, including artificial intelligence sources (*e.g.* ChatGPT)

Frequently Asked Questions

Detailed policies are outlined in this syllabus, as well as the lab manual—please read those carefully. For ease, a selection of questions and answers are depicted in the graphic, below.

What happens if…





Tentative lectures schedule:

1. Introduction,
2. Mendelian inheritance
3. Mitosis and meiosis
4. Transcription
5. Gene expression
6. Translation
7. Biotechnology
8. Genomics
9. Genetic Mapping
10. Extension of Mendelian inheritance
11. Evolutionary genetics
12. Population genetics
13. Quantitative genetics

Appendix & Policies

Academic Integrity

The University of Victoria and the Department of Biology take academic integrity (including plagiarism) as a serious matter. Please read this:
https://www.uvic.ca/calendar/undergrad/index.php#/policy/Sk_0xsM_V

Use of AI

You are not allowed to use AI for any graded assignments or exams. That is considered a breach of academic integrity. Unless specifically quoted, all words in graded assignments must be written by you.

Missed examinations and assignments

You are NOT required to provide a medical note. If a test is missed (with valid reason), contact your instructor immediately. Your instructor may opt to have you write a deferred test (scheduled for 9am on the Saturday following the original test date), or have those grades reallocated to another assessment. If the Final Lecture Exam + Lab Test 2 is missed, arrangements must be made to: 1) Write a deferred exam before the end of the exam period, or 2) Request an Academic Concession to write the exam at a later date. For missed laboratory assignments, refer to the Laboratory Manual.

Territory Acknowledgment

The instructors of BIOL230 are grateful to live and work in the unceded territories of the Lekwungen speaking First Nations, and we support the University of Victoria's official territory acknowledgment:
"We acknowledge and respect the lək̓ʷəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day."

Code of Conduct, and Commitment to Equity, Diversity and Inclusion (EDI)

All participants of BIOL230 are expected to treat each other with mutual respect. The course team welcomes students of all backgrounds, regardless of nationality, ethnicity, gender, sexual orientation, religion, age, etc.

Accessibility and special needs

Students with special needs will be welcomed and accommodated, provided those needs are registered through the Centre for Accessible Learning (https://uvic.ca/services/cal; phone: 250-472-4947)

Course Grade and Academic Transcript

Grades for all UVic courses are submitted as percentiles. A student's academic transcript will include the percentile grade and a letter grade plus the class average and the number of students registered in the course at the time of the final exam. Percentiles will be rounded to the nearest whole number; a grade of xx.5 will be rounded up, grade of xx.4 will be rounded down. Percentile grades will be converted to letter grades on the student's academic transcript according to the table given below.

A+ 90-100%; A 85-89%; A- 80-84%; B+ 77-79%; B 73-76%;
B- 70-72%; C+ 65-69%; C 60-64%; D 50-59%; F <49%

A grade less than 50% is a failing grade and results in an "F" on your transcript. Failure to complete lab requirements, including missing more than 2 labs will result in an incomplete grade and an "N" on your transcript