

BIOL 261 03 2214
Molecular and General Genetics
3 Credits
Winter 2022

This syllabus is subject to change and any changes will be posted in the Announcements section of your Moodle course.

Disclaimer: In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

1. General Information

Instructor	Dr. Whiteway
E-Mail Address:	malcolm.whiteway@concordia.ca
Class Hours, Place	Tuesdays and Thursdays, 13:15 – 14:30 EST; by Zoom Conference
Course Web Site:	Moodle site accessible after registration in the course
Office Hours	Zoom, Tuesday 14:30-15:30, by appointment
Prerequisites:	None
Teacher Assistants	Joseph Trani Michelle Vandeloo Hananeh Ghafelehbash

For all confidential communications, contact the instructor not by email.

Please allow for a 24-hour response time during the week (Monday-Friday). Teaching Assistants check their messages once over the 48-hour weekend period and are not available on statutory or university holidays.

The lectures will be on-line on Zoom, but also recorded and posted to Moodle for review. If you have questions you can ask them on the portal, or in your tutorial section, or you can email me.

1. Course description

Genetics is one of the most interesting and important topics in biology. It is a fascinating subject in itself, and in the last few decades it has also become an extremely important component of many other specialities within biology. There have been very rapid advances in understanding genetics and there has been extensive development of new information based on recombinant DNA

technology and whole genome analysis. Advances in DNA sequencing are providing us with amazing insights into ourselves as a species, and how we fit into the web of life. We are thus studying genetics at a very propitious time. Overall, genetics, genomics and recombinant DNA technology are having a large impact on science, medicine, agriculture, forensics and industry.

At a practical level, genetic research is creating new methods of disease diagnosis and treatment, more efficient ways to create and manufacture pharmaceutical products, new ways to decontaminate polluted land, novel approaches to the improvement of crops and the reduction of pesticide use in agriculture, and new tools for the forensic identification of victims and perpetrators of crimes. The development of biotechnology is also creating controversies that include concerns over discrimination in health insurance based on genetic predisposition to diseases, worries over the potential loss of personal privacy, and concerns over GMOs and the patenting of genes and organisms.

In this course we will provide the basic concepts of genetics to develop a foundation on which your education and your public awareness of these issues will be able to grow.

2. Course objectives

On completion of this course, students should be able to perform the following tasks:

- Solve questions based on mono and dihybrid crosses
- Write essays on genetics-related topics
- Explain the functioning of cellular processes such as transcription and translation
- Describe genetic transmission in bacteria
- Explain the relationship between genes and cancer
- Map genes on chromosomes
- Solve questions based on genetic complementation
- Solve questions based on gene regulation circuits
- Describe the Hardy-Weinberg equilibrium
- Solve problems based on genetic engineering and genomics

3. Required Texts

Essential Genetics and Genomics Hartl (7th edition)

4. Course framework

Week 1: January 6 – January 10	
Chapter 1	Genes are DNA
Week 2: January 10 – January 14	

Chapter 1	DNA structure One gene one enzyme
Week 3: January 17 – January 21	
Chapters 1 and 2	Transmission genetics
	Complementation; Monohybrid and dihybrid segregation
Week 4: January 24 – January 28	
Chapter 3	Chromosomal basis of heredity
Week 5: February 1 – February 4	
Chapter 4	The mapping of genes on eukaryotic chromosomes
Week 6: February 7 – February 11	
Chapter 6	DNA-structure and function
Week 7: February 14 – February 18	
Chapter 7	The Genetics of Bacteria and Their Viruses
Week 8: February 21 – February 25	
Chapter 8	Gene expression (transcription and translation)
	Midterm exam Feb 24th
Break week	
Week 9: March 7 – March 13	
Chapter 9	The lac operon, attenuation, eukaryotic promoters
Week 11: March 21 – March 27	
Chapter 10	Sections 10.3-10.5
	Restriction endonucleases, ligation DNA cloning, plasmid vectors, DNA cloning, sequencing
Week 12: March 28 – April 3	
Chapter 13	Genetics and Cancer
Week 13: April 4 – April 10	
Chapter 14	Population Genetics

Week 14: April 11 – April 17	
Chapter 5	Chromosome behavior
Chapter 10	Genomics

5. Assessments

GRADED ASSESSMENTS

COMPONENT	Due date	GRADE %
Tutorial mark	Weekly	25%
Midterm exam	Feb 24	25%
Final exam	To be scheduled	50%

Description of Graded Assessments

- The midterm exam will be 25 multiple choice questions
- The final exam will be 50 multiple choice questions

Quizzes will start in the third week of the semester and are given every week thereafter. Approximately 11 quizzes will be given; your 6 best quiz grades will be taken to determine 60% of your tutorial mark (i.e. 15% of your overall score for the course). These quizzes will be 5 multiple choice questions per quiz. Short essay questions are assigned each week starting in the first week of the semester. Your top six essay scores are taken to determine 40% of your tutorial mark (i.e. 10% of your overall score for the course). These will be graded on the quality of the answer both for scientific correctness and for the quality of the presentation (clarity of logic, correct grammar...)

If the final exam mark is higher than the midterm exam mark, the midterm exam score will be ignored, and the grading scheme becomes:

25% Tutorial

75% Final Exam

YOU MUST TAKE THE MIDTERM EXAM FOR THIS POLICY TO BE INVOKED.

6. Grading Distribution

GRADE CHART

Letter Grade	Numerical Grade
A+	90% and up
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	49% and below
F/DNW	Fail/Did not write
NR	No record

7. Policies: Late Submissions and Extensions

Late essays will only be graded if a valid excuse is provided.

8. Use of Zoom

Zoom will be used in this course to facilitate learning at a distance. It may be used to record some or all of the lectures and/or other activities in this course. If you wish to ensure that your image is not recorded, speak to your instructor as soon as possible.

Also, please note that you may not share recordings of your classes and that the instructor will only share class recordings for the purpose of course delivery and development. Any other sharing may be in violation of the law and applicable University policies, and may be subject to penalties.

Note: Zoom is included as an institutionally-approved technology. This means we have been assured of the privacy protections needed to use freely within the classroom.

If video recording is used for virtual classrooms or teleconferencing, students may choose whether or not they want to withhold their image from being displayed. Students may not be penalized should they choose not to have their image recorded. In cases where this prevents participation in course activities, alternate means of participation by the student may be required by the instructor.”

Here is the link to the full text:

<https://www.concordia.ca/ctl/technology-guidelines.html>

9. 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.

Link to the Code of Rights and Responsibilities:

<https://www.concordia.ca/content/dam/common/docs/policies/official-policies/BD-3.pdf>

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11. IP

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Link to Academic Code of Conduct:

<https://www.concordia.ca/content/dam/common/docs/policies/official-policies/AcademicCode-Conduct-2015.pdf>

Link to Policy on Intellectual Property:

<https://www.concordia.ca/content/dam/common/docs/policies/official-policies/VPRGS-9.pdf>

12. Extraordinary Circumstances

For undergraduate courses & courses that are cross-listed with graduate courses:

In the event of 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.

For graduate courses:

In the event of extraordinary circumstances, 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.

Link to Academic Calendar:

<https://www.concordia.ca/academics/undergraduate/calendar/current.html>

13. Ethical Behaviour

Plagiarism

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 could be material copied word for word from books, journals, internet sites, professor’s course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. Plagiarism does not refer to words alone - it can also refer to copying images, graphs, tables, and ideas. “Presentation” is not limited to written work. It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English 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!

Link to the Academic Integrity Website:

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

Accessibility

Instructor will strive to make learning experience as accessible and inclusive as possible. If you have accessibility needs that require academic accommodations, please meet with an advisor from the Access Centre for Students with Disabilities (ACSD) as soon as possible to set up an accommodation plan. I welcome meeting with all students to discuss their accessibility needs.

Link to ACSD:

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

14. Use of Third-Party Software & Web Sites

If you are using third-party software and/or web site, see the guidelines and include a statement. Information and standard wording found here in the link below.

Link to technology guideline

<https://www.concordia.ca/ctl/technology-guidelines.html>

15. List of Student Services

1. Access Centre for Students with Disabilities
<https://www.concordia.ca/students/accessibility.html>
2. Student Success Centre
<https://www.concordia.ca/students/success.html>
3. Counselling and Psychological Services
<http://www.concordia.ca/students/counselling-life-skills>
4. Concordia Library Citation and Style Guides
<https://library.concordia.ca/help/citing>
5. Health Services
<http://www.concordia.ca/students/health>
6. Financial Aid and Awards
<http://www.concordia.ca/offices/faao>
7. Academic Integrity
<http://www.concordia.ca/students/academic-integrity>
8. Dean of Students Office
<http://www.concordia.ca/offices/dean-students>
9. International Students Office
<http://www.concordia.ca/students/international>
10. Student Hub
<http://www.concordia.ca/students>
11. Sexual Assault Resource Centre
<http://www.concordia.ca/students/sexual-assault>
12. As a Concordia student, you are a member of the Concordia Student Union and have many resources available to you including:
 - a. HOJO (Off Campus Housing and Job Bank)

<https://www.csu.qc.ca/services/hojo/>

b. CSU Advocacy Centre

<https://www.csu.qc.ca/services/advocacy/>

13. Aboriginal Student Resource Centre

<http://www.concordia.ca/students/aboriginal>