

## Course Information

### General Course Information

Course: **BIOL 205**

Course title: **Mendelian and Molecular Genetics**

Pre-requisites: A GPA of 1.90 in BIOL 102/3.0 and BIOL 103/3.0.

Semester and year: Fall 2024

Number of credits: 3.0

Learning hours: 120

Modality: On Campus

### Course Description

**An introduction to Mendelian and Molecular Genetics covering the basic mechanisms of genetic transmission, gene structure and function, as well as the application of molecular genetics in medicine and biotechnology.**

### Topics

Week	Module	Topic
1	The Genetics Revolution	Introduction to genetics, we will cover 1.The birth of genetics, 2. after cracking the code, and 3. genetics today
2	Single Gene Inheritance	We will learn the inheritance patterns in crosses that reveal the existence of individual genes having a measurable effect on the phenotype of a eukaryotic organism.
3	Independent Assortment of Genes	Mendel's law of independent assortment and the chromosomal basis of independent assortment
4	Mapping Eukaryotic Chromosomes by Recombination	We will learn what inheritance patterns are produced by two or more heterozygous genes located on the same chromosome.
5	Genetic Interaction	Genes do not work alone and we will learn the inheritance patterns that reveal various types of gene interaction.
6	The Genetics of Bacteria and their Viruses	We will learn how the studying the genetics of bacteria and viruses lead to technologies like DNA cloning and Gene editing.
7	DNA: Structure and Replication	We will learn how the structure of DNA, (1) holds the genetic information that determines how organisms are built,

		and (2) is accurately copied to make it possible for genetic information to be inherited when cells divide and organisms reproduce.
8	RNA: Transcription, Processing and Decay	We will understand the mechanisms of RNA synthesis, processing, and decay as well as how RNA and protein factors regulate these mechanisms.
9	Proteins and their Synthesis	We will learn about the final stage of information transfer: translation (the synthesis of a protein copy of an RNA).
10	Regulation of Gene Expression in Bacteria and Eukaryotes	We will understand classic examples of positive and negative regulation in the control of genes and the role of chromatin-based mechanisms that maintain gene expression.
11	Gene Isolation and Manipulation	We will learn the methods that are used to detect and quantify RNAs, proteins, and specific regions of DNA as well as methods to alter the sequence and amounts of these molecules.
12	Genomes and Genomics	We will learn how a combination of experimental and computational methods are used to sequence genomes and to identify functional elements within those genomes.

### Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Know the experiments by which genetics developed from Mendel to today.
2. Know the molecules involved in storage and expression of genetic information.
3. Explain single-gene inheritance ratios in terms of chromosome behaviour at meiosis.
4. Recognize inheritance patterns diagnostic of autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive, and Y-linked conditions in human pedigrees.
5. Know the molecular tools that molecular geneticists use such as DNA cloning, Sequencing and Genome editing and how they are applied.
6. Understand the mechanisms of how (1) DNA is replicated, (2) RNA is transcribed and (3) Proteins are translated at the molecular level.
7. Explain the roles of DNA-binding proteins and DNA regulatory sequences in coordinating the expression of genes.

### Important University Dates

Please visit the [Faculty of Arts and Sciences Sessional Dates website](#) for all academic deadlines.

# Inclusion

## Land Acknowledgement

*Let us acknowledge that Queen's University occupies traditional Anishinaabe and Haudenosaunee territory. To acknowledge this traditional territory is to recognize its longer history, one predating the establishment of the earliest European colonies. It is also to acknowledge this territory's significance for the Indigenous Peoples who lived, and continue to live, upon it and whose practices and spiritualities are tied to the land and continue to develop in relationship to the territory and its other inhabitants today. Indigenous communities in Kingston/Katarokwi continue to reflect the area's Anishinaabe and Haudenosaunee roots. There is also a significant Métis community and First Peoples from other Nations across Turtle Island present here today. To read more about the history of the land, see the [Queen's Encyclopedia](#) and to learn more about land acknowledgements, see the [Office of Indigenous Initiatives](#).*

## Equity, Diversity, and Inclusivity Statement

*Queen's University recognizes that the values of equity and diversity are vital to and in harmony with its educational mission and standards of excellence. It acknowledges that direct, indirect, and systemic discrimination exists within our institutional structures, policies, and practices and in our community. These take many forms and work to differentially advantage and disadvantage persons across social identities such as race, ethnicity, disability, gender identity, sexual orientation, faith, and socioeconomic status, among other examples. In this class I will create an inclusive environment where all students feel valued and supported. Every member of this class is asked to show respect for every other member.*

## Building a Classroom Community

University is a place to share, question, and challenge ideas. Each student brings a different set of lived experiences. You can help to create a safer, more respectful classroom community for learners by following these guidelines:

- Make a personal commitment to learn about, understand, and support your peers.
- Assume the best of others and expect the best of them.
- Recognize and value the experiences, abilities, and knowledge each person brings to the course.
- Acknowledge the impact of oppression on other people's lives and make sure your words and tone are respectful and inclusive.
- Encourage others to develop and share their ideas.
- Pay close attention to what your peers say/write before you respond. Think through and re-read what you have written before you post online or send your comments to others.
- Be open to having your ideas challenged and challenge others with the intent of facilitating growth.
- Look for opportunities to agree with one another, building on and intentionally referencing peers' thoughts and ideas; disagree with ideas without making personal attacks, demeaning, or embarrassing others.

## Fostering Accessibility

All of us have a shared responsibility for fostering accessibility and promoting meaningful inclusion of those with disabilities. The [Accessibility Hub](#) at Queen's University's Human Rights & Equity Office offer a host of [tutorials](#) that provide us all with practical tips for:

- creating accessible documents, e.g., to submit to your teaching team or share with peers in peer feedback activities/in a presentation,
- emails, e.g., while communicating with group members or your teaching team, and
- meeting practices (e.g., in tutorials/labs/seminars or virtual meetings).

## Name/Pronoun

If, for whatever reason, you wish to change how your name appears in onQ and/or on class lists, please follow these steps. You may also use this process to add your pronouns to the appearance of your name.

1. Log into SOLUS.
2. Click on Personal Information tab.
3. Click on the Names tab
4. Click on the Add New Name tab
5. Choose Preferred from the Name Type drop down menu
6. Enter the name you would like to appear in onQ and/or on class lists.
7. Click Save.

Please allow 24 to 48 hours for your name to be registered within the system. If you have further questions or concerns, please contact ITS at Queen's University.

## Course Materials & Technologies

### Recommended Course Textbooks

Course Textbooks	Edition(s)	Publisher	For Purchase	At Queen's Library? Y
<a href="#">Introduction to Genetic Analysis</a>	12th	W.H. Freeman, Macmillan Learning	<a href="#">Campus Bookstore</a>	Y or N?

### Other Required Materials

NA

### Supplemental Materials

NA

### Educational Technologies, Help, Privacy, and Accessibility

This course makes use of the following website(s), program(s), and/or application(s) for specific educational use/purposes: **OnQ**

**Privacy:** Be aware that your independent use of the website(s), programs, and/or application(s) used in this course, *beyond what is required*, is subject to their terms of use and privacy policy. You are encouraged to review the applicable privacy statements before using the site. Please see below.

**Accessibility:** Queen's University is committed to developing courses that are accessible. For further information on accessibility compliance of the website(s), program(s) application(s) used in the course, please consult the links below.

Queen's Human Rights & Equity Office's [Accessibility Hub](#).

### **Notice of Recording**

Synchronous (live) classes will be delivered in this course through Zoom and/or Teams, video conferencing platforms supported by the University. Steps have been taken by the University to configure these platforms in a secure manner. Classes will be recorded with video and audio (and, in some cases, transcription) and will be made available to students in the course for the duration of the term. The recordings may capture your name, image or voice through the video and audio recordings. By attending these live classes, you are consenting to the collection of this information for the purposes of administering the class and associated coursework. If you are concerned about the collection of your name and other personal information in the class, please contact the course instructor to identify possible alternatives.

To learn more about how your personal information is collected, used and disclosed by Queen's University, please see the [Notice of Collection, Use and Disclosure of Personal Information](#).

### **Copyright of Course Material**

Course materials created by the course instructor, including all slides, presentations, handouts, tests, exams, and other similar course materials, are the intellectual property of the instructor. It is a departure from academic integrity to distribute, publicly post, sell or otherwise disseminate an instructor's course materials or to provide an instructor's course materials to anyone else for distribution, posting, sale or other means of dissemination, without the instructor's express consent. A student who engages in such conduct may be subject to penalty for a departure from academic integrity and may also face adverse legal consequences for infringement of intellectual property rights.

## **Communication**

### **Questions about the Course and Contacting the Teaching Team**

Contact Information for the teaching team will be posted on the OnQ course website

### **Queen's Email**

The university communicates with students via Queen's email. Please check your email regularly to ensure you do not miss important information related to your course.

## Course Feedback

At various points during the course, you may be asked to take part in a variety of feedback activities, such as surveys and questionnaires. This feedback enables the teaching team to improve the course. All surveys are anonymous and are directly related to activities, assessments, and other course material.

## Assessments

### Weighting and Alignment with Course Learning Outcomes (CLOs)

Assessment	Alignment with CLOs	Weighting
Midterm Exam	Course Learning Outcomes 1-4	30%
Final Exam	Course Learning Outcomes 5-7	30%
Weekly Quizzes	Course Learning Outcomes 1-7	10%
Tutorial and Lab Assignments	Course Learning Outcomes 1-7	30%
Total		100%

### Assessment Flexibility

NA

### Descriptions of Learning Activities and Assessments

#### Assessment 1

Midterm Exam: multiple choice/short answer and will test on Weeks 1-6

#### Assessment 2

Final Exam: multiple choice/short answer and will test on Weeks 7-12)

#### Assessment 3

Weekly Quizzes: multiple choice/short answer and will test on the previous week's lectures)

#### Assessment 4

Tutorial and Lab Assignments: Tutorial will consist of guided sessions where students and instructors work through different genetics problems. Lab will take place on alternate weeks and will be an opportunity for students to apply the knowledge learned in tutorials to different case studies.

### Proctored Exams

#### Timing of Final Examinations

Once the exam schedule has been finalized, the exam date will be posted on your SOLUS account. The exam dates for each term are listed on the Faculty of Arts and Science webpage under "[Important Dates](#)." Student exam schedules for the Fall Term are posted on SOLUS immediately prior to Thanksgiving and on the Friday before Reading Week for the Winter Term. Students should **delay finalizing any travel plans until after the examination schedule has been posted**. Exams will **not be moved or deferred** to accommodate employment, travel/holiday plans or flight reservations. For information regarding what is considered extenuating circumstances and qualifications for Academic Consideration, please visit the [Faculty of Arts and Science's Academic Consideration webpage](#).

## **Assignment Submission Policy**

**Exams and Quizzes:** Unlike the written submissions, the weekly quizzes and exams do NOT have built-in grace periods. This is because of the interactive nature of the discussions and academic integrity issues associated with quizzing. Thus, students are asked to use the Academic Considerations Portal when relevant for these assessments.

**Tutorial and Lab Assignments:** Tutorial assignments and labs are completed in person during the respective session. Due to the guided and/or group work aspect of these activities grace periods cannot be given and late penalties do not apply. Students who are unable to attend their registered tutorial or lab section should obtain academic consideration for that time and they will be given the assignment for independent completion, due 48 hours following receipt of the assignment.

**Late Policy:** Late assignments beyond the grace period (without long-term Considerations or Accommodations) for the papers and without approved Considerations or Accommodations for the Discussions and Quizzes will be penalized **5% per day (or part thereof)** that it is late, including weekends, unless arrangements have been made.

Please see the Academic Considerations for Students with Extenuating Circumstances and Accommodations for Disabilities sections of the syllabus for more information.

## **Policy Review of Graded Work**

Requests for assignment regrading may be made to your TA 48 hours after you have received the marked copy of your assignment, but no more than 10 days later. Be sure to read your TA's feedback carefully before you submit a review of graded work. To request that your assignment be reviewed, please include the following in your regrade request:

- Your name, student number, and TA's name.
- The original copy of your marked assignment, attached.
- Your reason for the request:
  - The specific aspects of your assignment that you believe were not sufficiently awarded, referring to the categories of the rubric.
  - Why you believe that your assignment meets the criteria for a higher mark for each of the categories of the rubric that you indicated above. Please make explicit reference to the detailed descriptions of each category provided in the rubric.

If a review of graded work results in only a slightly different final grade, the original grade will stand. Should we find an error where marks were not assigned when they should have been or were missed in adding up the total score or were added up incorrectly resulting in a higher score than earned, the grade will be changed so that it is accurate. Grades would only increase or decrease if there was evidence of an error in marking, not simply because the regrader interprets or applies the rubric slightly differently than the original grader.

## Policies

### Class Attendance

Your presence and participation in class contributes to the knowledge and skills that you will develop throughout this course. I expect that you attend class regularly, participate in class conversations and learning activities. These types of activities provide active engagement, promote a deeper understanding of the course content, and contribute to your success in this course.

### Academic Support

All undergraduate students face new learning and writing challenges as they progress through university: essays and reports become more complex; effectively incorporating research into writing becomes more important; the types of assignments become more diverse; managing your time and developing the skills you need to read and think critically gets more challenging. I encourage students to contact Student Academic Success Services (SASS). SASS offers many different ways to receive support:

- Free online or in-person [appointments](#) to get personalized support on writing and academic skills from expert staff and trained peers.
- [Workshops](#) and [drop-in programs](#). SASS' [Events Calendar lists events coming soon](#).
- [Online resources](#) that provide strategies for academic skills and writing development at university.
- If English is not your first language, SASS has specific resources for [English as Additional Language students](#), including weekly programs and EAL academic skills appointments. You can meet on an ongoing basis with an EAL consultant to work on your academic writing, speaking, listening, and reading skills.

### Accommodations for Disabilities

Queen's University is committed to working with students with disabilities to remove barriers to their academic goals. Queen's Student Accessibility Services (QSAS), students with disabilities, instructors, and faculty staff work together to provide and implement academic accommodations designed to allow students with disabilities equitable access to all course material (including in-class as well as exams). If you are a student currently experiencing barriers to your academics due to disability related reasons, and you would like to understand whether academic accommodations could support the removal of those barriers, please visit the [QSAS website](#) to learn more about academic accommodations or start the registration process with QSAS by clicking **Access Ventus** button at [Ventus | Accessibility Services | Queen's \(queensu.ca\)](#)

VENTUS is an online portal that connects students, instructors, Queen's Student Accessibility Services, the Exam's Office and other support services in the process to request, assess, and implement academic accommodations.

To learn more go to: <https://www.queensu.ca/ventus-support/students/visual-guide-ventus-students>

### Academic Consideration for Students in Extenuating Circumstances

Academic Consideration is a process for the University community to provide a compassionate response



to assist students experiencing unforeseen, short-term extenuating circumstances that may impact or impede a student's ability to complete their academics. This may include but is not limited to,

- Short term Physical or Mental Illness or Injury (stomach flu, anxiety/depression, mononucleosis, concussion, broken bones, surgery, medical treatments, etc.)
- Traumatic Event/Confidential (Bereavement, serious injury, illness or required treatment for a significant other/family member or a traumatic event such as divorce, sexual assault, social injustice, etc.)
- Requirements by Law or Public Health Authorities (court dates, jury duty, requirements to isolate, etc.)
- Significant Event (varsity athletic event, distinguished event, serving in the Reserve Forces, etc.)

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances. For more information, please see the [Senate Policy on Academic Consideration for Students in Extenuating Circumstances](#).

Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. For more information, undergraduate students in the Faculty of Arts and Sciences should consult the Faculty's webpage on [Academic Consideration in Extenuating Circumstances](#) and submit a request via the [Academic Consideration Request Portal](#). Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

Students are encouraged to submit requests as soon as the need becomes apparent and to contact their instructor and/or course coordinator as soon as possible once academic consideration has been granted. Any delay in contact may limit the options available for academic consideration.

For more information on the Academic Consideration process, what is and is not an extenuating circumstance, and to submit an Academic Consideration request, please see the Faculty of Arts and Science's [Academic Consideration website](#). ASO courses include links to information on **Academic Consideration** on your **Course Homepage** in onQ.

Please see the Teaching Team page for contact information for your instructor and TA(s), where relevant.

### **Queen's Policy Statement on Academic Integrity**

Queen's University is dedicated to creating a scholarly community free to explore a range of ideas, to build and advance knowledge, and to share the ideas and knowledge that emerge from a range of intellectual pursuits. Queen's students, faculty, administrators and staff therefore all have responsibilities for supporting and upholding the fundamental values of academic integrity. Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility and by the quality of courage. These values and qualities are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University.

The following statements from "The Fundamental Values of Academic Integrity" (2nd edition), developed by the International Center for Academic Integrity (ICAI), contextualize these values and qualities:

1. **Honesty** Academic communities of integrity advance the quest for truth and knowledge through intellectual and personal honesty in learning, teaching, research, and service.
2. **Trust** Academic communities of integrity both foster and rely upon climates of mutual trust. Climates of trust encourage and support the free exchange of ideas which in turn allows scholarly inquiry to reach its fullest potential.
3. **Fairness** Academic communities of integrity establish clear and transparent expectations, standards, and practices to support fairness in the interactions of students, faculty, and administrators.
4. **Respect** Academic communities of integrity value the interactive, cooperative, participatory nature of learning. They honor, value, and consider diverse opinions and ideas.
5. **Responsibility** Academic communities of integrity rest upon foundations of personal accountability coupled with the willingness of individuals and groups to lead by example, uphold mutually agreed-upon standards, and take action when they encounter wrongdoing.
6. **Courage** To develop and sustain communities of integrity, it takes more than simply believing in the fundamental values. Translating the values from talking points into action -- standing up for them in the face of pressure and adversity — requires determination, commitment, and courage.

Students are responsible for familiarizing themselves with and adhering to the Senate [regulations](#) concerning academic integrity, along with [Faculty or School](#) specific information. Departures from academic integrity include, but are not limited to, plagiarism, use of unauthorized materials, facilitation, forgery and falsification. Actions which contravene the regulation on academic integrity carry sanctions that can range from a warning, to loss of grades on an assignment, to failure of a course, to requirement to withdraw from the university.

### **Syllabus statements for Generative Artificial Intelligence (AI) Tools (select one of the following)**

*Permitted with citation*

*Students must submit their own work and cite the work that is not theirs. Generative AI writing tools such as ChatGPT are welcome in this class, provided you cite the material that they generate. Any other use constitutes a Departure from Academic Integrity.*

Queen's [Student Academic Success Services](#) (SASS) offers a self-directed, online academic integrity module which we encourage all students to take which will help with:

- Understanding the nature of the academic integrity departure
- Understanding the expectations of and role of sources in scholarly writing
- Integrating sources into your writing (paraphrasing, quoting, summarizing)
- Understanding when and how to cite your sources
- Managing your time effectively to avoid the need for shortcuts
- Taking effective notes to ensure accuracy of source material and correct attribution

### **Turnitin Statement**

This course makes use of Turnitin, a third-party application that helps maintain standards of excellence in academic integrity. Normally, students will be required to submit their course assignments through onQ to Turnitin. In doing so, students' work will be included as source documents in the Turnitin reference database, where they will be used solely for the purpose of detecting plagiarized text in this course. Data from submissions is also collected and analyzed by Turnitin for detecting Artificial

Intelligence [\(AI\)-generated text](#). These results are not reported to your instructor at this time but could be in the future.

Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. The similarity report generated after an assignment file is submitted produces a similarity score for each assignment. A similarity score is the percentage of writing that is similar to content found on the internet or the Turnitin extensive database of content. Turnitin does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process.

Please read Turnitin's [Privacy Policy](#), [Acceptable Use Policy](#) and [End-User License Agreement](#), which govern users' relationship with Turnitin. Also, please note that Turnitin uses cookies and other tracking technologies; however, in its service contract with Queen's Turnitin has agreed that neither Turnitin nor its third-party partners will use data collected through cookies or other tracking technologies for marketing or advertising purposes.

For further information about how you can exercise control over cookies, see [Turnitin's Privacy Policy](#).

Turnitin may provide other services that are not connected to the purpose for which Queen's University has engaged Turnitin. Your independent use of Turnitin's other services is subject solely to Turnitin's Terms of Service and Privacy Policy, and Queen's University has no liability for any independent interaction you choose to have with Turnitin.

*Portions of this document have been adapted, with permission, from the University of Toronto Centre for Teaching Support and Innovation tip sheet "[Turnitin: An Electronic Resource to Deter Plagiarism](#)".*