

# Course Information

## General Course Information

Course: BIOL331

Course title: Analytical Genomics

Pre-requisites: BIOL 205/3.0 or BCHM 218/3.0

Semester and year: W25

Number of credits: 3

Learning hours: 120

Modality (on campus, blended, or online): On-campus

Classroom accessibility: Consult Queen's website

## Course Description

This course will explore the structure of genomes and the nature and origin of gene families as well as large scale functional genomics methods for analysis of novel gene function and regulation.

Genomics is one of the most rapidly moving fields in modern science. It has an impact in all areas of biology and life science. The course has two broad areas of focus:

1. Bioinformatics  
Approximately one half of the course is directed at introducing genomic databases and the software tools to compare gene and genome sequences and infer evolutionary relationships. Assignments during the term ensure that students become proficient at running various programs and interpreting the results. Web based software is used; no direct programming is involved.
2. Functional genomics  
The other half of the course focusses on assigning biological function to genes discovered through sequencing programs. The approaches include computer analysis, mutational analysis, gene and protein interaction. The student will have an appreciation of the strengths and limitations of such methods as well as recognition of the current limits of experimental science. This portion of the course relies heavily on the current research literature.

## Topics

Week	Topic
1	Course overview
1-6	Bioinformatics
7-12	Functional genomics

## Course Learning Outcomes

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

1. Understand various genomic databases, sequencing technologies, and sequence data
2. Apply different programs to analyse various types of genetic data
3. Understand and perform commonly used high-throughput functional analyses
4. Critically evaluate and interpret high-throughput analysis results

## 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 work to promote an anti-discriminatory, anti-racist and accountable environment where everyone feels welcome. 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

### Required Course Textbooks

Course Textbooks	Edition(s)	Publisher	For Purchase	At Queen's Library?
None – see OnQ for more details	Edition(s).	Publisher.	Where to purchase?	Y or N?

### 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.

Software	Use	Support	Privacy	Accessibility
onQ	Online learning	Queen's IT	Queen's IT	Queen's IT

**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.

### **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**

Please see the onQ page for information about contacting the teaching team.

### **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
Final exam	1-4	25%
Assignments	1-4	40%
Quizzes	1-4	35%

Total 100%

### **Assessment Flexibility**

The quizzes are designed to provide you with practice applying the concepts and provide feedback on your understanding. To build in flexibility for all students, only your best 7/8 quizzes will count towards your grade.

## Descriptions of Learning Activities and Assessments

### Assessment 1

Final exam – will cover the material for the second half of the course

### Assessment 2

Assignments – students will be asked to analyse datasets and use existing databases to learn about an organism, process, or gene of interest

### Assessment 3

Quizzes – to help students keep pace with the course material and to get first-hand experience with the tools and concepts introduced in the course

## Proctored Exams

### Timing of Final Examinations

Once the exam schedule has been finalized by the Queen's exam office, 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

### **Late Policy for Assignments:**

*Late assignments without approved Considerations or Accommodations will be penalized **10% per day (or part thereof)** that it is late, including weekends, unless arrangements have been made. **The absolute last day to submit a late assignment in this course is 5 days after the deadline.** Anything that arrives after this will not be accepted unless previous permission from the instructor has been granted.*

*Students with letters of accommodation must confirm the implementation of their accommodations **prior** to the listed due date. Please see the "Accommodations for Disabilities" section of this syllabus for more information.*

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

*Students experiencing short-term extenuating circumstances that are beyond their control and may affect their academic work **must submit a request to their faculty office for academic consideration.** Please see the "Academic Considerations for Students in Extenuating Circumstances" section of this syllabus for more details.*

**Written Submissions:** *The written submissions (i.e., [assignments](#)) will be due on the specified deadline. If you have extenuating circumstances when a submission is due, you must obtain Academic Considerations. Requests for extensions without Academic Considerations will not be considered. Please note that technical difficulties with personal computers or websites do not qualify as a valid reasons for*

*accommodations. If you encounter issues with personal computers, note that computers are available for student use at several Queen's libraries (<https://library.queensu.ca/locations-hours/computers>). Similarly, all websites used in the course are monitored by the teaching team the week leading up to the assignment due date. Unless we encounter issues during this time frame, no extensions will be given for delays associated with online resources.*

**Quizzes:** *Quizzes will be opened for a period of 4 days. After this period, quizzes will be closed and not available for completion. Students must use the Academic Considerations Portal when relevant for these assessments.*

### **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 email:*

- *Your name, student number, and TA's name.*
- *The original copy of your marked assignment and TA feedback, 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. We expect that you will 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)**

*Students must submit their own work and cite the work that is not theirs. Using generative AI writing tools such as ChatGPT in your submitted work is not permitted in this class unless explicitly stated otherwise in the assignment's instructions. This type of 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.

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*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](#)".*