

The University of Western Ontario  
Department of Biology  
Winter 2026

**Biology 4561G Course Outline:  
Genes and Genomes I**

**1. Calendar Description**

An examination of genome-level analytic methods in the context of more accurately defining the genotype-phenotype relationship. Topics to be covered include functional genomics, synthetic genomics, genome-wide association studies, machine learning, and synthetic genetic arrays.

**Prerequisite(s):** Biology 3596A/B; and one of the following: Biology 3594A/B, Biology 3595A/B, Biology 3597A/B; and one additional 0.5 course in Biology at the 3000 level or above; and registration in year 4 of an Honors Specialization module or a Major in Genetics offered through the Department of Biology. **Extra Information:** 2 lecture hours, 0.5 course. Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

**2. Course Information**

**Instructor:** Dr. Jim Karagiannis

**Office:**

**Office Hours:** .

**Phone:** Ext. 80975

**Email:** [jkaragia@uwo.ca](mailto:jkaragia@uwo.ca)

**Lectures:**

All emails to Dr. Karagiannis must contain “Bio4561G” in the subject line. Students must use their Western (@uwo.ca) email address.

### **3. Course Materials**

All course material will be posted to OWL: <https://westernu.brightspace.com/>. Students are responsible for checking the course OWL site regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class. If students need assistance with the course OWL site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

A textbook will not be used as a learning resource due to the great speed with which the discipline has advanced in recent years. Instead, the course will make extensive use of contemporary articles from the field's most respected journals.

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will not change. Any assessments affected will be conducted online as determined by the course instructor.

### **4. Technical Requirements**

- Personal computer with stable internet connection

### **5. Learning Outcomes**

- Students will develop a comprehensive understanding of the principles of genome assembly and be able to relate how these principles are applied to the creation of synthetic organisms
- Students will be able to describe and discuss the ethical ramifications associated with the emerging discipline of synthetic biology
- Students will be able to describe the experimental methods used to carry out genome-wide association studies (GWAS) and relate how these methods allow scientists to identify disease associated genetic variants
- Students will become familiar with the concept of machine learning and understand how this method is applied to the analysis of large, complex, genome-level data sets
- Students will be able to analyze and discuss the ramifications of high throughput, massively parallel next generation sequencing technologies
- Students will understand how synthetic genetic array analysis is used to generate genetic interaction maps and how these maps provide insight into the genotype-phenotype

relationship

- Students will be able to critically analyze select, high impact articles from the primary literature and assess their overall biological significance and societal impact

## 6. Evaluation

Biology 4561G is officially designated an essay course by the Faculty of Science. According to University guidelines "an essay course must normally involve total written assignments (essays or other appropriate prose composition, excluding examinations) as follows: Half course (2000 and above): at least 2500 words." In addition, "the structure of the essay course must be such that in order to pass the course, the student must exhibit some minimal level of competence in essay writing and the appropriate level of knowledge of the content of the course."

The mark breakdown will be as follows:

<b>Test #1</b>	15%
<b>Test #2</b>	15%
<b>Essay</b>	20%
<b>Group Presentation</b>	15%
<b>Participation:</b>	5%
<b>Final Exam (To be scheduled by the Registrar):</b>	30%

Essays will be written on an individual basis. Presentations will be carried out in groups. Missed components (for which relief/consideration has been approved) will result in a reweighting of the mark breakdown.

Please note that this course adheres to the university-wide descriptors for the meaning of letter grades:

A+	90-100	One could scarcely expect better from a student at this level
A	80-89	Superior work which is clearly above average
B	70-79	Good work, meeting all requirements, and eminently satisfactory
C	60-69	Competent work, meeting requirements
D	50-59	Fair work, minimally acceptable
F	below 50	Fail

## 7. General Information About Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf)

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

[https://registrar.uwo.ca/academics/academic\\_considerations/](https://registrar.uwo.ca/academics/academic_considerations/)

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Final Exam (Defined by policy)
- Group Presentation (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

## **8. Religious Accommodation**

When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays: <https://www.edi.uwo.ca>.

## **9. Accommodation Policies**

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf)

## **10. Academic Policies**

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

In accordance with policy,

[https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf),

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

The use of non-programmable calculators is allowed during tests and exams.

**Scholastic offences** are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system.

Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

## **11. Support Services**

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic-related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at:

[https://www.uwo.ca/health/student\\_support/survivor\\_support/get-help.html](https://www.uwo.ca/health/student_support/survivor_support/get-help.html).

To connect with a case manager or set up an appointment, please contact [support@uwo.ca](mailto:support@uwo.ca).

Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC <https://westernusc.ca/services/>.