

The University of Western Ontario  
Department of Biology  
Fall 2023

**Biology 4561F 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

**Lectures:**

All emails to Dr. Karagiannis must contain "Bio4561F" in the subject line. Students must use their Western (@uwo.ca) email address.

### **3. Course Materials**

Students should visit OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated. Students are responsible for visiting OWL on a regular basis. If students need assistance, they can seek support on the OWL 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**

- Stable internet connection
- Computer with working microphone and webcam (microphone and webcam will only be required if circumstances force a return to fully online learning)

### **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 4561F 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 (2500 words)</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. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

### **Assessments worth less than 10% of the overall course grade:**

Missed assessments will result in a reweighting of the mark breakdown.

### **Assessments worth 10% or more of the overall course grade:**

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at [https://uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf)

The Student Medical Certificate is available at

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

### **Absences from Final Examinations**

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s)

for which the final examination has been deferred. See the Academic Calendar for details (under Special Examinations).

## **8. Accommodation and Accessibility**

### **Religious Accommodation**

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

### **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%20Accommodation disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation%20disabilities.pdf).

## **9. Academic Policies**

The website for Registrarial Services is <http://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 will be allowed in 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:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_under\\_grad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_under_grad.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>).

## 9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling 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 the Student Development Centre (<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/>.

## **10. Land Acknowledgment**

We acknowledge that Western University is located on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Attawandaron peoples, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum. This land continues to be home to diverse Indigenous peoples (e.g. First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital contributors of our society.

More information about Indigenous Services (<https://indigenous.uwo.ca/>) and this Land Acknowledgement (<https://communications.uwo.ca/comms/land-acknowledgement/>) are available.