

Biology 3594B Course Outline 2025

1. Course Information

Course Information

Biology 3594B – Genome organization, mutagenesis and DNA repair

List of Prerequisites

Biochemistry 2280A; Biology 2581A/B.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) 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. Instructor Information

Instructors	Email	Office	Office Hours
Dr. Patrick McDonald	pmcдона5@uwo.ca		Wed. 11:30 am Fri. 12:30 pm
Jessica Sinka	jsinka2@uwo.ca		

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

Office hours are held in-person in BGS 3046.

3. Course Syllabus, Schedule, Delivery Mode

Course Description: This course [Biology 3594b] will cover concepts related to DNA organization, replication, mutagenesis and repair in both prokaryotic and eukaryotic organisms. Lecture topics will include current literature in DNA mutagenesis and repair designed to permit direct examination of concepts, experimental design, methodology, data analysis and future trends.

Learning Outcomes and Objectives:

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

Assess the characteristics of bio-indicator species.

Describe measures of cyto-genotoxicity.

Distinguish between sources of environmental DNA and their use in DNA barcoding and meta-barcoding.

Explain the effects of alcohol on DNA and the body.

Demonstrate an understanding of mutation signatures and how particular signatures are created.

Contrast episodic mutation acquisition to more gradual acquisition.

Describe hypermutation and the role of DNA repair.

Contrast the mutation spectra of different organisms.

Describe and illustrate a diagram for common methods for DNA damage assays, mutation detection assays and gene/genome sequence analysis techniques

Assemble a mutation report.

Bio 3594 Tentative Schedule 2025

Lecture	Date	Topic	Reading
1	Jan. 7	Intro to Bio 3594	
2	Jan. 9	Cyto-genotoxicity in carp	Paper 1
3	Jan. 14	Cyto-genotoxicity in carp 2	Paper 1
4	Jan. 16	Cystic Fibrosis mutation assignment	
5	Jan. 21	Universal mini-barcode	Paper 2
6	Jan. 23	Universal mini-barcode 2	Paper 2
7	Jan. 28	Alcohol and Aldehydes	Paper 3
8	Jan. 30	Alcohol and Aldehydes 2	Paper 3
9	Feb. 4	Alcohol and Aldehydes 3	Paper 3
10	Feb. 6	Acrylamide	Paper 4
11	Feb. 11	Acrylamide 2	Paper 4
12	Feb. 13	Review	
	Feb. 18 Feb. 20	Reading week	
13	Feb. 25	Midterm	
14	Feb. 27	APOBEC	Paper 5
15	Mar. 4	APOBEC 2	Paper 5
16	Mar. 6	APOBEC 3	Paper 5
17	Mar. 11	Hypermutation in cancer	Paper 6
18	Mar. 13	Hypermutation in cancer 2	Paper 6
19	Mar. 18	Hypermutation in cancer 3	Paper 6
20	Mar. 20	Omicron mouse origin	Paper 7
21	Mar. 25	Omicron mouse origin 2	Paper 7
22	Mar. 27	Omicron mouse origin 3 / Thylacine	Paper 7
23	Apr. 1	Thylacine 2	Paper 8
24	Apr. 3	Review	

Classes begin: January 6, 2025
Spring Reading Week: February 17 – 21, 2025
Classes end: 4, 2025
Exam period: April 7 – 30, 2025

Contingency plan

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. Course Materials

Required Reading: This includes a selection of research papers. They will be posted on the Biology 3594B OWL site.

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: <http://owl.uwo.ca>.

If students need assistance with the course OWL site, 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.

Technical Requirements



Stable internet connection



Laptop or computer with webcam



Working microphone

5. Methods of Evaluation

The overall course grade will be calculated as:

Midterm exam	30%	Feb. 25 in class
OWL Quizzes	10%	best 4 of 5 (Due Jan. 24, Feb. 14, Feb. 28, Mar. 14, Mar. 28)
Written assignment	20%	due March 28 at 11:00 pm
Final exam	40%	Scheduled by registrar during April exam period

6. 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:

OWL quizzes will be scored with the best 4 of 5 counting towards your final grade. This will accommodate for a missed quiz. For any additional missed quizzes, please contact Dr. McDonald (pmdona5@uwo.ca).

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 Advising Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

https://www.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.

A make-up midterm exam will be held for students who miss the midterm with accommodation. Students who are unable to write the make-up midterm, will have their final exam re-weighted to account for the missed midterm.

Accommodation for the assignment deadline will result in an extension to that deadline.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Advising 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](#)).

7. 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 an accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Advising office of their Faculty of Registration. Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays:

<https://www.edi.uwo.ca>.

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.

8. Academic Policies

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

In accordance with policy,

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 electronic devices is not permitted on the midterm or final 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.

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>).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

9. 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.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

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/>.