

Biology 3594B Course Outline

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 prerequisites for this course or written special permission from the Department of Biology to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

2. Instructor Information

Instructors	Email	Office	Office Hours
Dr. Patrick McDonald	pmcdona5@uwo.ca		Wed. 9:00 am
TA: Luana Branco Alecrim	lbrancoa@uwo.ca		
TA: Mikaelison da Silva Lima	mdasil66@uwo.ca		

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

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 2026

Lecture	Date	Topic	Reading
1	Jan. 6	Intro to Bio 3594	
2	Jan. 8	Cyto-genotoxicity in carp	Paper 1
3	Jan. 13	Cyto-genotoxicity in carp 2	Paper 1
4	Jan. 15	Cystic Fibrosis mutation assignment	
5	Jan. 20	Universal mini-barcode	Paper 2
6	Jan. 22	Universal mini-barcode 2	Paper 2
7	Jan. 27	Alcohol and Aldehydes	Paper 3
8	Jan. 29	Alcohol and Aldehydes 2	Paper 3
9	Feb. 3	Alcohol and Aldehydes 3	Paper 3
10	Feb. 5	Acrylamide	Paper 4
11	Feb. 10	Acrylamide 2	Paper 4
12	Feb. 12	Review	
	Feb. 17 Feb. 19	Reading week	
13	Feb. 24	Midterm	
14	Feb. 26	APOBEC	Paper 5
15	Mar. 3	APOBEC 2	Paper 5
16	Mar. 5	APOBEC 3	Paper 5
17	Mar. 10	Hypermutation in cancer	Paper 6
18	Mar. 12	Hypermutation in cancer 2	Paper 6
19	Mar. 17	Hypermutation in cancer 3	Paper 6
20	Mar. 19	Omicron mouse origin	Paper 7
21	Mar. 24	Omicron mouse origin 2	Paper 7
22	Mar. 26	Omicron mouse origin 3 / Thylacine	Paper 7
23	Mar. 31	Thylacine 2	Paper 8
24	Apr. 2	Human Genome	Paper 9
25	Apr. 7	Human Genome	Paper 9
26	Apr. 9	Review	

Classes begin: January 5, 2026
Spring Reading Week: February 14 – 22, 2026
Classes end: April 9, 2026
Exam period: April 12 – 30, 2026

4. Course Materials

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

All course material will be posted to OWL: <https://westernu.brightspace.com/>

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) 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.

Technical Requirements



Stable internet connection



Laptop or computer with webcam



Working microphone

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as:

Midterm exam	30%	Feb. 24 in class
OWL Quizzes	10%	best 4 of 5 (Due Jan. 23, Feb. 13, Feb. 27, Mar. 13, Mar. 27)
Written assignment	20%	due March 27 at 11:59 pm
Final exam	40%	Scheduled by registrar during April exam period

Use of Generative AI Tools

AI tools are allowed for brainstorming/organization. AI tools are not permitted for the final production/writing of the Assignment.

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://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/

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:

- Examinations scheduled during official examination periods (Defined by policy)

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.

Evaluation Scheme for Missed Assessments

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 for the period of accommodation (for up to 1 week).

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.

Coursework with Assessment Flexibility

By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

Flexible Completion

Quizzes. This course has 5 quizzes, and the 4 quizzes with the highest marks are counted towards your final grade. Should extenuating circumstances arise, students do not need to request Academic Consideration for the first missed quiz. Academic consideration requests will be denied for the first missed quiz. Academic Consideration requests may be granted when students miss more than 1 quizzes, and these additional (3rd, 4th...) missed quizzes will be reweighted to the final exam.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday or observance conflicts with an examination, test, or other scheduled academic obligation, students must request accommodation via the University's Student Absence Portal (SAP). This request should identify the conflict and specify which course component(s) (e.g. test, midterm, exam) are affected.

Students are encouraged to submit the SAP request as early as possible, but no later than two weeks before any examination, or one week before any mid-term test or quiz, to allow sufficient time for adjustment.

The SAP request serves as official notification to both the course instructor and the Academic Advising Office, in accordance with University policy:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The Faculty of Science considers religious accommodations as scheduling conflicts. Instructors should provide either a make-up exam or an earlier sitting of the same exam to accommodate the student.

For more information on recognized religious holidays, please visit the Diversity Calendar posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca>

6.2 Academic 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.

6.3 General Academic Policies

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

Use of @uwo.ca email: 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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as "appeals")

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences:

https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a *scholastic offence*, even if the device is not in use.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

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.

6.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, 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 (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced GBSV (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. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

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

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.

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