

Earth Sciences 4431a and 9506 Course Outline

1. Course Information

Course Information

4431A/9506 ISOTOPE GEOCHEMISTRY IN EARTH AND ENVIRONMENTAL SCIENCE

List of Prerequisites

Earth Sciences 2230A/B or Earth Sciences 3341A/B or completion of any 2000 level half-course in Chemistry; or registration in the third or fourth year of an Environmental Sciences module; or permission of the Department.

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course or written special permission from the Department of Earth Sciences to enroll in it, they may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on their academic record.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

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Liz Webb	ewebb5@uwo.ca	BGS 0168	x80208	By appointment
Audrey Morrison	amorr224@uwo.ca			

Students must use their Western (@uwo.ca) email addresses when contacting their instructors and put the course number (e.g. 4431a) in the subject line. I am always happy to meet with students to answer questions, so please feel welcome to email me and request a meeting.

3. Course Syllabus, Schedule, Delivery Mode

Format: In person lectures

Location: PAB 150

Fall term 2026

Monday, Wednesday and Friday 11:30-12:20

Learning Outcomes

After taking this course students will be able to

- Use the delta value and big delta value to describe stable isotope values of natural materials
- Develop fractionation factors that describe temperature dependent fractionation of isotopes between two phases.
- Be familiar with the steps required to acquire stable isotope values and assess the quality of the data produced.

- Interpret natural processes and chemical reactions based on the stable isotope values (O,H,C,S,N) of natural materials including processes in the atmosphere, hydrosphere, sedimentary and diagenetic systems, hydrothermal systems, fluid migration, ore-forming fluids, igneous and metamorphic rocks and environmental applications that pertain to groundwater, oceans, wetlands, acid rain; diet reconstructions, climate fluctuation and global cycle modification.
- Students in 9506 will interpret a real-world set of isotope data, justify their findings in context with the current literature, and assess the limitations of their knowledge.

Course Outline

This outline is a guide only. Isotope Science is a dynamic tool that is applied to scientific research in many different fields. Course content may change depending on feedback from the class and current topics. If you have interest in a subject that is not covered here, please contact the instructor.

1. Introduction

Importance to geological studies, isotopes of interest and some general principles, the atom, chart of the nuclides and isotopes, atomic mass units and atomic weight, binding energy, nuclear stability, cosmic abundance of the elements, the history of stable isotope geochemistry, definitions (the δ -value, α , $10^3 \ln \alpha$, Δ -value), standards, method of study, extraction techniques, mass spectrometry.

2. Stable isotopes in the atmosphere and hydrosphere

Equilibrium fractionation of isotopes, kinetic processes, the meteoric water line, Rayleigh distillation, oxygen and hydrogen isotopes in rain, snow and ice, the oceans (evaporation, ice cap effects, pore waters in oceanic sediments), ground water, soil water, geothermal waters, formation waters in sedimentary basins, glaciers, paleothermometry in the oceans and on land, the isotopic composition of the oceans through time.

3. Stable isotope variations in igneous rocks

Introduction, oxygen reservoirs (water, sedimentary rocks, the mantle and derivative rock types), mineral ordering, fractional crystallization, the oxygen-isotope geochemistry of granitoid rocks (normal ^{18}O , low- ^{18}O and meteoric water interaction, high ^{18}O rocks and the role of sediments, isotopic exchange between granitic rocks and their country rocks), oxygen-isotope geothermometry in igneous rocks, meteorites, mass independent fractionation.

4. Stable isotope variations in weathering and diagenetic processes

Submarine weathering, oxygen- and hydrogen-isotopes in soil clays and chemical weathering, carbonates and patinas, diagenesis (sandstone) and the Western Canada Sedimentary Basin

5. Carbon-, nitrogen - and sulphur-isotope studies of organic matter, fossil fuels and related materials

Introduction to carbon isotopes, carbon in modern biosphere (photosynthesis) and in soils, fossil fuels, and carbonates, study of diet and migration, atmospheric CO_2 , carbon in the lithosphere. Introduction to nitrogen isotopes. Nitrogen isotopes in diet, soils and plants. Introduction to sulphur isotopes, biogenic fractionation, sulphur in recent sediments, hydrocarbons, coal, igneous and sedimentary rock, ore deposits and the environment.

Important dates:

1. Classes begin: September 9, 2026
2. Refer to the lecture timetable for due dates of weekly problem sets
3. LSIS Lab Tour: **Friday October 9 (optional, no lecture)**
4. Fall Reading Week: October 10 – 18, 2026
5. MWL Challenge: **Friday October 23, 2026** (during regular class time)
6. Mid-term test: **Wednesday November 4, 2026** (during regular class time)
7. Diagenesis Challenge: **Monday November 23, 2026** (during regular class time)
8. 9506 graduate students submit their major project **Friday November 27, 2026**
9. Final Challenge: **Monday December 7, 2026** (during regular class time)
10. Classes end: December 9, 2026
11. Exam period: December 11 – 22, 2026

4. Course Materials

Textbook and Other Learning Materials

Required textbook: Sharp Z. (2007) Stable Isotope Geochemistry. Pearson Prentice Hall. 344 p.
You can download the digital version for FREE at this site: https://digitalrepository.unm.edu/unm_oer/1/
There are short readings associated with most lectures, and you are expected to read this material.

Electronic Devices: Some lectures will include online polls and questions through Mentimeter. You will require a phone to participate. Participation is not required, but it is a little bit fun. You will require a scientific calculator for assignments and exams.

All course material will be posted to OWL Brightspace: <https://westernu.brightspace.com/>
Students are responsible for checking the course OWL Brightspace 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 Brightspace 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.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

For undergraduate students in **4431a** the overall course grade will be calculated as listed below:

- Weekly problem sets 30% (8 take-home + 2 in class, grade is based on best 8 out of 10)
- Midterm Test 30% **Wednesday November 4 @ 11:30, in class PAB 150**
- Final Exam 40% Set by the Registrar's office

For graduate students in **9506** the overall course grade will be calculated as listed below:

- Weekly problem sets 20% (8 take-home + 2 in class, grade is based on best 8 out of 10)
- Midterm Test 25% **Wednesday November 4 @ 11:30, in class PAB 150**
- Major Assignment 20% **Friday November 27, 2026**
- Final Exam 35% Set by the Registrar's office

Information for Problem Sets (30%):

- There are 10 problem sets in total, about 1 problem set assigned per week. Please see the table below for the dates that the problem sets are assigned (usually on a Friday) and when they are due (usually the following Friday by 5 pm).
- Problem sets 1, 2, 3, 4, 5, 7, 8 and 10 are take-home assignments and you have one week to complete them. You have two weeks to complete problem set #5 because of reading week.
- Problem set # 6 (**Friday October 23**) and Problem set # 9 (**Monday November 23**) will be completed in class and submitted at the end of the lecture period. Late submissions are not allowed for these two in-class problem sets.

Information for the Midterm (30%):

- The midterm will be during the lecture period on **Wednesday November 4, 2026**
- The midterm will cover material up to and including the lecture on Monday November 2, which is the end of the unit on paleoclimate reconstruction.
- It is advised that to study for the midterm that you complete all of the problem sets up to this point (1 to 6). You should also read the assigned pages in the textbook and study the lecture notes.
- The exam will last for 50 minutes.
- Questions will be short answers and some calculations (calculators are required).

Information for the Final Exam (40%):

- The date and time for the final exam will be set by the Registrar's office during the exam period (Dec 11 to 22).
- The final exam will be 3 hours long and is cumulative. It covers all material from the start of the course to the last lecture.
- There will be short answer questions and calculations (bring a calculator).
- Study the lecture material, the textbook readings and be sure to do the questions on the problem sets.

Essential Learning Requirements

Even when Academic Consideration is granted for missed coursework, the following are essential to earn a passing grade in this course to ensure that students demonstrate sufficient mastery of the learning outcomes:

- All students must achieve a minimum grade of 50% on the final exam
- Graduate students enrolled in 9506a must achieve a minimum grade of 50% on the Major Assignment

When a student has not demonstrated proficiency in an essential learning requirement listed above, and when the shortfall results from a granted Academic Consideration, they will be withdrawn (WDN) from the course. The student may appeal to the Associate Dean (Academic) for reinstatement with an Incomplete (INC) standing. Where an appeal for INC is granted, their maximum course load may be reduced during the term in which they complete the outstanding course requirements.

2026 Schedule for 4431a and 9506a: Lectures and Assignments				
	2026	Lectures	Assignments	
			Date assigned	DUE DATE
Wednesday	9-Sep-26	Introduction - Isotopes		
Friday	11-Sep-26	Nuclear stability	Problem set #1	
Monday	14-Sep-26	Definitions δ , α , 1000 $\ln\alpha$ and Δ		
Wednesday	16-Sep-26	Definitions and standards		
Friday	18-Sep-26	Methods	Problem set #2	Problem Set #1
Monday	21-Sep-26	Mass spectrometry		
Wednesday	23-Sep-26	Fractionation		
Friday	25-Sep-26	GMWL and Rayleigh Distillation	Problem set #3	Problem Set #2
Monday	28-Sep-26	GMWL and d-excess		
Wednesday	30-Sep-26	National Day of Truth and Reconciliation		
Friday	2-Oct-26	Rain effects and evaporated waters	Problem Set #4	Problem Set #3
Monday	5-Oct-26	Soil water and ground water		
Wednesday	7-Oct-26	Geothermal water, pore waters formation waters		
Friday	9-Oct-26	LAB TOUR	Problem Set #5	Problem Set #4
Monday	12-Oct-26	THANKSGIVING		
Wednesday	14-Oct-26	READING WEEK		
Friday	16-Oct-26	READING WEEK		
Monday	19-Oct-26	ice cores		
Wednesday	21-Oct-26	ocean water variation and paleothermometers		
Friday	23-Oct-26	MWL CHALLENGE 1 (in class)	Problem set #6 (in class)	Problem Set #5 &6
Monday	26-Oct-26	paleothermometers		
Wednesday	28-Oct-26	oceans water buffers		
Friday	30-Oct-26	Continental paleoclimate	Problem Set #7	
Monday	2-Nov-26	Continental paleoclimate		
Wednesday	4-Nov-26	MIDTERM		
Friday	6-Nov-26	Igneous rocks - general variations		Problem Set #7
Monday	9-Nov-26	Igneous rocks - Granites		
Wednesday	11-Nov-26	Geothermometry		
Friday	13-Nov-26	Meteorites	Problem Set #8	
Monday	16-Nov-26	weathering (clays)		
Wednesday	18-Nov-26	Diagenesis - patinas		
Friday	20-Nov-26	Diagenesis - WCSB		Problem Set #8
Monday	23-Nov-26	CHALLENGE 2 W/R ratios	Problem Set #9 (in class)	Problem Set #9
Wednesday	25-Nov-26	photosynthesis and soil organic matter		
Friday	27-Nov-26	carbon in soils and paleodiets	Problem Set #10	9506 assignment due
Monday	30-Nov-26	nitrogen and carbon in paleodiets		
Wednesday	2-Dec-26	fossil fuels/atmospheric CO ₂ /marine sediments		
Friday	4-Dec-26	S isotopes and marine sediments		Problem Set #10
Monday	7-Dec-26	S-isotopes and ore deposits and pollution		
Wednesday	9-Dec-26	Review		
	Dec 11-22	FINAL EXAM	Exam room	

4431a and 9506 - Assigned Readings									
Sharp, Z. (2018, e-edition) Stable Isotope Geochemistry. Pearson Prentice Hall									
Chapter	pages	# pages	Section	Topic	Importance			Notes	
					Important	Slightly	for interest		
STABLE ISOTOPES									
1	1 - 5	4	1.2	historical background			X		
	5 - 9	4	1.3	Scope of Discipline	X				
	9 - 10	1	1.4	Abundances of Isotopes	X				
	10 - 11	1	1.5	Elements that Fractionate	X				
	12 - 13	1	1.6	Application	X				
	13 - 15	2	1.7	Isotope Effects	X				
TERMINOLOGY									
2	1 - 2	1	2.1	Overview			X		
	1 - 2	1	2.2	Terminology	X				
	2 - 7	5	2.3	Delta Value	X				
	8 - 9	1	2.4	Fractionation factor	X				
	10 - 11	1	2.5	1000ln α	X				
	12 - 19	7	2.6	Reference standards		X		focus on H ₂ O, C,N, S	
	19 - 29	10	2.7	Mass spectrometry	X			focus on mass spectrometry	
	30 - 32	2	2.8	Laser adsorption mass spectrometry		X			
FRACTIONATION									
3	1 - 2	1	3.1	Introduction	X				
	2 - 8	6	3.2	Fractionation factors		X		study equations from lectures	
	9 - 10	1	3.3	Relationship to temperature	X				
	10 - 14	4	3.4	Determining fractionation factors	X				
	14 - 15	1	3.5	Empirical fractionation factors	X				
	19 - 22	3	3.7	Multiple isotope systems	X			applies to meteorites	
22 - 23	1	3.8	Clumped Isotopes			X	if we have time		
METEORIC WATER									
4	1 - 2	1	4.1	Hydrosphere Overview			X		
	2 - 3	1	4.2	Isotopologues of water	X				
	3 - 4	1	4.3	Meteoric water	X				
	4 - 10	6	4.4	Meteoric water line (MWL)	X				
	10 - 12	2	4.5	Deuterium excess	X				
	12 - 18	6	4.6	Evaporation and Condensation	X				
	19 - 24	5	4.7	factors affecting precipitation	X				
	24 - 26	2	4.8	Ground water	X				
	26 - 28	2	4.9	Geothermal Systems	X				
	28 - 30	2	4.10	Formation Waters	X				
	30 - 36	6	4.11	Glacial Ice	X				
36 - 38	2	4.12	Triple isotopes in water			X	if we have time		
OCEANS									
5	1 - 2	1	5.1	Overview		X			
	2 - 6	4	5.2	Modern Oceans	X				
	6 - 7	1	5.3	Depth profiles		X			
	7 - 8	1	5.4	Productivity		X		carbon is later in the course	
	9 - 11	2	5.5	Ancient Oceans	X				
	11 - 14	3	5.6	Seawater-basalt buffering	X				
15 - 17	2	5.7	Buffering again!	X					
CARBONATES									
6	1 - 2	1	6.1	Introduction			X		
	2 - 5	3	6.2	Phosphoric Acid method			X		
	6 - 10	4	6.3	Paleothermometer Scale	X				
	11 - 19	8	6.4	factors affecting paleothermometry	X				
	19 - 25	6	6.5	applications of paleothermometry	X				
	25 - 27	2	6.6	Clumped isotope paleothermometry			X	if we have time	
CARBON									
	1 - 1	0	7.1	Introduction			X		
	1 - 2	1	7.2	The carbon cycle			X		
	3 - 12	9	7.3	Carbon reservoirs	X			focus on plants, CO2 and organics	
	12 - 22	10	7.4	carbon isotopes in carbonates	X				
	22 - 23	1	7.5	terrestrial carbonates		X			
LOW TEMPERATURE MINERALS									
8	1 - 1	0	8.1	Introduction			X		
	1 - 10	9	8.2	Phosphates	X			focus on mammals	
	10 - 15	5	8.3	Cherts		X		focus on diatoms and phytoliths	
	16 - 19	3	8.4	Clay minerals	X				
	19 - 21	2	8.5	Iron oxides			X		
NITROGEN									
9	1 - 2	1	9.1	Introduction			X		
	2 - 3	1	9.2	The nitrogen cycle		X			
	3 - 6	3	9.3	N-isotope fractionation		X			
	6 - 11	5	9.4	Nitrogen isotope values of materials		X			
	11 - 15	4	9.5	Nitrogen in animals	X				
SULFUR									
10	1 - 2	1	10.1	Introduction		X			
	2 - 3	1	10.2	Analytical techniques			X		
	4 - 6	2	10.3	Equilibrium Fractionation	X				
	7 - 10	3	10.4	Sedimentary Sulfur		X			
	10 - 15	5	10.5	secular variations in sulfur	X				
	15 - 16	1	10.6	S in the terrestrial environment		X			
	16 - 17	1	10.7	Oxygen isotopes in sulphates			X		
IGNEOUS PETROLOGY									
11	1 - 1	0	11.1	Introduction			X		
	1 - 7	6	11.2	The mantle	X			oxygen only	
	14 - 20	6	11.3	Plutonic rocks	X				
	20 - 22	2	11.4	Fluid-rock ratios		X			
	22 - 26	4	11.5	other processes		X			
EXTRA TERRESTRIAL MATERIAL									
13	1 - 2	1	13.1	Introduction		X			
	1 - 3	2	13.2	Classification of meteorites		X			
	3 - 11	8	13.3	Oxygen isotopes of the solar system	X				
229									

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.

Midterm

This course has 1 midterm test and a **cumulative** final exam. There is no makeup test for a missed midterm. If a student misses a midterm, its weight will shift automatically to their final exam grade. If their final exam grade is higher than their midterm grade, their final exam grade will replace the midterm's weight in their overall grade. They do not need to request Academic Consideration for a missed midterm; the reweighing will be done automatically.

The only exception is an early sitting, offered solely for a university-sanctioned schedule conflict (e.g., conflict of two midterms, Varsity competitions) or a religious accommodation that prevents a student from writing the midterm at its scheduled time. If a student requires this accommodation, they must notify their instructor in writing no later than one week before the test. No other circumstance, including illness, qualifies for an early sitting or makeup; these are addressed through the automatic reweighing described above.

Problem Sets

This course has 10 problem sets. Students are expected to complete 8 of 10 to receive full credit for this component. If they miss up to 2 problem sets, they do not need to request Academic Consideration; the missing item(s) will not count against them, and their grade for this component will be calculated from their best 8 submissions.

If a student completes fewer than 8 of the total, the missing items will be recorded as a zero and included in their grade for this component. They are encouraged to submit all work, even if incomplete, since a partial mark is always better than a zero. If their final exam grade is higher than their overall grade on this component, their final exam grade will replace it. Please note that historically marks for problem sets are always higher than marks for exams so I strongly advise submitting all problem sets. In addition, the problem sets are good training for the exams.

Deadlines: The 48-Hour No-Late-Penalty Period

All take-home assignments with a stated due date include an automatic 48-hour period after the deadline during which students may still submit without a late penalty. For example, if an assignment is due on November 5, they may submit it until November 7 without penalty. After this 48-hour period, no further submissions will be accepted, and students do not need to request Academic Consideration for a missed deadline; their grade for this component will be calculated as described above.

Special Examination

Per university policy, Academic Consideration requests with supporting documentation are required for the final examinations scheduled during official examination periods by the Registrar's Office.

If the student has been approved by the Academic Advising Office to write a Special Examination (SPC) and the final exam is their only outstanding course component, an SPC will be assigned to them and scheduled by the instructor per university policy.

If the student misses their SPC exam and is approved for Academic Consideration, they will be withdrawn from the course without academic penalty. If they experienced extenuating circumstances such as prolonged illness, they may appeal to the Associate Dean (Academic), on a case-by-case basis, for the opportunity to write the final exam the next time the course is offered. An outstanding SPC will reduce their course load for the term in which the exam is deferred, as outlined in the [Definitions of Types of Examinations](#) policy.

If the student misses their SPC exam and Academic Consideration is not approved, or was not requested, they will receive a grade of zero on the exam.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday either requires a student to be absent from the University or requires or prohibits an activity that makes it impossible for them to complete an academic requirement scheduled that day, they are entitled to accommodation. No student will be penalized for an absence for religious reasons, and an alternative means of satisfying the requirement will be arranged. This accommodation is provided in accordance with the University's policy on Accommodation for Religious Holidays:

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

The student should submit their requests through the Student Absence Portal (SAP), identifying the conflict and the specific course component(s) affected (e.g., test, midterm, exam).

Midterms and Tests: If a religious observance conflicts with a midterm test, they must submit their request no later than **one week** before the test. Their instructor will arrange an early sitting of the test. As set out above, no makeup test is offered for any other reason; this early sitting is available specifically for this accommodation.

Final Examinations: If a religious observance conflicts with the final exam, the student must submit their request no later than **two weeks** before the exam. Their instructor will arrange a Special Examination to take place no later than one month after the end of the examination period.

Students are responsible for finding out what was covered in any class they miss due to a religious observance, and for taking the appropriate steps to keep up with the course.

If a suitable arrangement cannot be reached between a student and their instructor, they should consult the Undergraduate Chair of the department offering the course, and if necessary, the Associate Dean (Academic) of the Faculty of Science.

For a list of recognized religious observances, please visit the calendars posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca> (About Us – Resources – Additional Resources – Calendars).

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

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

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

Procedures on Scholastic Offences (Graduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_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, hidden cameras and wireless earbuds.

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

Effective September 2026, the typical penalty for this offence is a failing grade in the course AND a 12-month prohibition on retaking the course.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is their 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 the student's responsibility to seek clarification before using any AI tools in academic work.

Use of Software for Assessments

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

Academic Advising. 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/advising/>.

Mental Health Support. 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.

Gender-Based and Sexual Violence. 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 a student has experienced GBSV (either recently or in the past), they can 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.

Accessibility for Coursework. A student may contact the course instructor if they require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to them. If they have any questions regarding accommodations, they may also contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html

Learning Development and Success. Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help students improve their learning skills. The facility offers 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.

Student Councils.

Student-run support services are offered by the University Students' Council (<https://westernusc.ca>) and the Science Students' Council (<https://www.westernssc.ca>).