# Earth Sciences 2260A Course Outline

## 1. Course Information

**Course Information**
**Earth Sciences 2260A: Stratigraphy and Sedimentology: From Beds to Basins – Fall 2025**
**Laboratories**: Monday 2:30 PM to 5:30 PM
**Lectures**: Tuesday and Thursday 11:30 AM to 12:30 PM
**Office hours**: Email to schedule an appointment
**Tutorial hours**: TBD

**List of Prerequisites**
Earth Sciences 1022A/B or Earth Sciences 2200A/B or permission of the Department.

Unless you have either the requisites for this course or written special permission from your Department/Program Advisors 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 | Phone | Office Hours |
|---|---|---|---|---|
| Dr. Alina Shchepetkina | ashchep@uwo.ca | | | Email to schedule |
| TA: Tess Gates-Flaherty | tgatesfl@uwo.ca | TBD | N/A | TBD |

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

# 3. Course Syllabus, Schedule, Delivery Mode

This course offers an introduction to sedimentology, stratigraphy, and basin analysis. It covers the formation of sediments and sedimentary rocks across diverse environments on Earth, including continental, marginal-marine, and marine settings. We will look at the origins, composition, transport, deposition of sedimentary rocks, and various sedimentary environments because it is necessary to know what the building blocks look like before we start to build stratigraphic successions. We will also talk about ichnology – the exciting science of trace fossils that represent the activities of living organisms, focusing on how they aid in interpreting past depositional environments. Stratigraphy helps interpret the order and timing of geological events in Earth's history, providing a framework for understanding sedimentary rocks within dynamic sedimentary environments. Finally, basin analysis will provide a broader perspective on the formation and filling of sedimentary basins, considering plate tectonic mechanisms and plate settings.

**Learning Outcomes**:

Upon successful completion of this course, you should be able to:
1. Identify the principal detrital and biogenic components of sedimentary rocks.
2. Identify the most common types of physical sedimentary structures and describe their origin in terms of fluid flow and environments of sedimentation.
3. Identify the main depositional environments, their constituent lithology, and typical sedimentary structures.
4. Relate the formation of the main types of sedimentary basins to causative plate tectonic mechanisms.
5. Apply the geological timescale as a basis from which to analyze the history of a sedimentary basin.

Classes begin: September 8, 2025
Fall Reading Week: November 3-9, 2025
Classes end: December 9, 2025
Exam period: December 11 – 22, 2025

**Anticipated Lecture Topics**:

Week 1: Introduction to the course. Clastic rocks. Grain-size scale.
Week 2: Erosion and transport. Weathering. Common minerals in sedimentary rocks. Mudrocks.
Week 3: Textural properties of sediments. Maturity of clastic material. Carbonate rocks. Bacteria. Chemical and volcanogenic sediments. Carbonaceous sediments. Banded iron formations.
Week 4: Transport media. Properties of fluids. Grain size and flow velocity. Laminar and turbulent flows. Reynolds number.
Week 5: Flow regimes and bedforms. Dunes, bars, plane bedding. Wave- and wind-formed structures.
Week 6: Gravity-driven sediment flows (mass flows). Turbidity currents. Turbidites.
Week 7: Sedimentary structures in paleogeography. *Mid-term test*.
Week 8: Glacial and aeolian environments. Alluvial fans. Intro to rivers, paleosols, lakes.
Week 9: READING WEEK.
Week 10: Intro to estuaries, deltas, and marine environments. Facies analysis.
Week 11: Trace fossils. Concepts of Stratigraphy.
Week 12: Concepts of Stratigraphy. Basin Types. Rift and divergent margin basins.
Week 13: Ocean, convergent margin, back-arc, forearc, foreland, and strike-slip basins.
Week 14: Epeiric and intracratonic basins. Practical Stratigraphy.
*Final exam (3 h)*

# 4. Course Materials

**Required textbook:** Gary Nichols: *Sedimentology and Stratigraphy*. (2nd or 3d Edition); also useful for 3314B. New and second-hand copies are available on Amazon (paperback copy from $59.50) – commonly cheaper than the UWO bookstore.
Amazon: https://www.amazon.ca/Sedimentology-Stratigraphy-Gary-Nichols/dp/1119417287
Wiley: https://www.wiley.com/en-ie/Sedimentology+and+Stratigraphy%2C+3rd+Edition-p-9781119417286
Seems to be available for download from ACADEMIA website:
https://www.academia.edu/9552581/Sedimentology_and_Stratigraphy

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.

# 5. Methods of Evaluation

**Grading Scheme and Assessment Dates**

The overall course grade will be calculated as listed below:

| | | |
|---|---|---|
| Lab assignments (7) | 32% | Lab assignments based on activities conducted during and after lab time |
| Pop-up quizzes (3) | 3% | Random, in-class quizzes (closed-book) based on course material covered |
| Midterm Test (1h) | 20% | Covers all lecture material up to and including the most recent lecture |
| Group project | 9% | Oral presentation on a recent paper in sedimentary geology in groups of two |
| Participation Q&A | 1% | Active participation in Q&A after oral presentation by peers, up to 1% |
| Final Exam (3h) | 35% | Written. Random questions covering the entire course |
| Extra project | | Optional essay on novel direction in sedimentary geology, up to 3% |

Pop-up quizzes will occur on random dates throughout the course (the dates are not announced beforehand), at the beginning of a lecture period. Cannot be re-written, if that lecture was missed, and a zero mark will be assigned.
Mid-term test, written, 50 min. Thursday, October 23d, 11:30–12:30.
Group project presentation, Monday, November 10th, 2:30–5:30 pm.
Final Exam: written, up to 3h. Random questions covering the entire course. Date and classroom: TBA.

**Lab Assignments**
Seven lab assignments related to work conducted during lab time will be assigned during the course. These lab assignments will typically be assigned on Monday (before the lecture covers the material: read posted lab presentation and notes beforehand!) and will be due at the beginning of lab on the following Monday. The graded assignments will be distributed at the beginning of the next lab. A schedule of assignments is given below.

| Lab Assignment | Lab date | Due Date |
|---|---|---|
| Lab #1: Products of weathering and erosion (4%) | September 8 | September 15 |

| | | |
|---|---|---|
| Lab #2: Clastic rocks (4%) | September 15 | September 22 |
| Lab #3: Carbonate rocks (4%) | September 22 | September 29 |
| Lab #4: Sedimentary structures and environments (4%) | September 29 | October 6 |
| Lab #5: Introduction to stratigraphy (4%) | October 6 | October 14 (lecture period) |
| Lab #6: West Alberta Correlation exercise | October 20 | October 27 |
| Lab #6 cont: West Alberta Correlation exercise (6%) | October 27 | November 10 |
| Group presentations, Q&A | November 10 | |
| Lab #7: Seismic exercise | November 17 | November 24 |
| Lab #7 cont: Seismic exercise (6%) | November 24 | December 1 |
| Q&A period for final exam | December 1 | |

**Group Project**

You are expected to work together in small groups (~2 people) to critically analyze a recent paper in sedimentary geology. Topics will include: 1) Carbonates on Mars, 2) Mudstone: Gotta Love Them, 3) Weathering on Mars, 4) Weathering in Antarctica/Arctic, 5) Turbidites, 6) Eolian Deposits, 7) Fluvial Deposits, 8) Estuaries and Trace Fossils, and 9) Deltas and Trace Fossils (papers must have been published between 2010 and 2025). If you have another topic in mind that is not mentioned here, please talk to your instructor in advance. You must note your paper selection on OWL by October 6. Groups will be assigned randomly by the instructor.

This Group Project will consist of an oral component, i.e., a 7-8 minute presentation by both authors followed by a 2-3 min question period on November 10. Every student in the audience will be expected to ask at least 1-2 questions during the Q&A period.
This assignment must be completed in order to receive credit in this class. If you are absolutely unable to attend the lab session dedicated to the oral presentations, you may schedule a time to present it in front of Dr. Shchepetkina and the TA.

**Extra Writing Assignment**

If you wish to increase your grade by up to 3% (up to a max of 100% for the entire course), you can complete a Writing Assignment, analyzing the relevant scientific literature and outlining YOUR ideas on an *emergent/emerging topic* in sedimentary geology. The report should include at least 5 va;id references, up to 4 figures; students are encouraged to procure and cite additional references. Due on or before December 1.

Students must write their essay in their own words, only responsible use of AI is permitted (i.e., for improving the sentence structure). Whenever students take an idea, or a passage from another author, they must acknowledge this both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. The essay should consist of a Title, Author Information, Abstract, Keywords, and Introduction, followed by the main body of the text (including figures), Conclusions, and References. The length of the text should not exceed 4 pages total (images, image captions, and references not included), using a 12 pt. font (Times Roman, Helvetica or Courier), single spacing, and "normal" margins. There should be up to 4 figures (with figure captions) illustrating the data and ideas. The figures should be properly explained in the text and cited (e.g., Fig. 6). All material must be properly referenced in the text (e.g., Zonneveld et al., 2012; Atkinson and Eastman, 2015) and the list of references should be included in the journal format (e.g., Wetzel, A., 2010. Deep-sea ichnology: observations in modern sediments to interpret fossil counterparts: Acta Geologica Polonica, v. 60, p. 125-138).

*Abstract*: Summarizes the main facts and interpretations presented in the essay. It should be comprehensible without reference to the main body of the document. No References should be cited in the Abstract. Less than 200 words.
*Introduction*: Set the background to the study/idea, identify what the main problem is, why this problem is important, and then outline how you will address this problem/idea in the essay.
*Main Body*: Think about the data and ideas presentation order. If methods need describing (for an essay this normally is not the case), this should come first. Present all of the data first, these are the observations and facts. Then present data interpretation, which should be consistent with the problem as identified in the Introduction.
*Conclusions*: This should summarize the interpretations from the main body of the paper. A minimal amount of data should be repeated here.

**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,

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, using the Student Absence Portal.

All Academic Consideration requests normally 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:

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**
If you miss a lab with supporting documentation provided, you will have to bring the finished lab by next lab session. For help, you can refer to fellow students, schedule a meeting with TA or professor. If no supporting documentation is presented, a zero mark will be assigned to that lab.

No extensions are allowed beyond December 9, with all missed/incomplete assignments assigned 0%. 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.

# 6. Additional Statements

**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.

**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.

**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,

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.

No electronic devices will be permitted on tests and exams, closed book.

**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.

**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/advising/

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.

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