EARTH SCIENCES 2200A: FUNDAMENTALS OF EARTH SCIENCES

COURSE OUTLINE (SYLLABUS)

1. Course Information

Course Information

Earth Sciences 2200A
Lectures: In Person, 2 hrs./week
Laboratory Hours: In person, 3 hrs./week

Pre- or Corequisites:

Any 0.5 Earth Sciences course at the 1000 level, or registration in any module within the Faculty of Science (or in the Basic Medical Sciences), or permission of the Department.

2. Instructor Information

Instructor: Dr. Cam Tsujita (Associate Professor); E-mail**:** ctsujita@uwo.ca
Instructor's Office: Biological and Geological Sci. Bldg., Rm 1064
Department of Earth Sciences (Main Office): Phone: (519) 661-3187. Fax (519) 661-3198
Instructor's Office Hours: 1:30 – 3:30 pm Mondays and Wednesdays (but feel free to make an appointment via email to Cam (at ctsujita@uwo.ca) if these times do not suit your timetable).Note: Students must use their Western (@uwo.ca) email addresses and put the course number 2200a in the subject line when contacting their instructors.

Contacting Your Teachers: If you have questions relating to the course, feel free to email me (your instructor, Cam Tsujita) for any course-related matters, or your TAs specifically for lab-related matters.

3. Course Syllabus, Schedule, Delivery Mode

Objectives of this course: This is a comprehensive geology course that covers geological processes and products in the context of Plate Tectonics. The course strives to enable students to identify minerals and classify important rock types of Earth's crust, and to understand the tectonic environments and processes in which different rock
types are formed, deformed, and transformed. To attain these goals, students will receive feedback on their techniques through weekly labs.

Note: this course may be used as an entry course for any Earth Sciences program**.**

Learning Outcomes: Upon successful completion of this course, the student will be able to:
1. Describe, identify and classify important minerals, rocks, and other Earth materials and interpret their modes of formation based on their observed characteristics.
2. Apply fundamental geologic concepts and methods to the interpretation of the spatial and temporal distribution of rocks, geologic structures, fossils, and geologic resources, as represented in geologic maps and cross-sections.
3. Relate lithologic and structural characteristics of rocks and their successions to plate tectonic processes and environments.

Background Required: This course is intended for (but not limited to) students registered in faculties other than Science.

Required text (E-text)
Earth: An Introduction to Physical Geology, Updated Fourth Canadian Edition by Tarbuck, Lutgens, Tsujita, and Hicock, 2019, with Mastering Geology. Important Note: When registering for Mastering Geology, you must use your Western email address as your Pearson Account username. When prompted for **course id, use: tsujita69166**. Further instructions on ordering and registering this Pearson product (Mastering Geology with e-text) are provided on OWL.
Other required materials:
1. 10x (or better) hand lens (will be available for purchase from Outcrop Club)
2. Lab assignment outlines (to be posted on OWL prior to each lab)
Power Point slides for notetaking in lectures will be available online on Western University's OWL site at least one day prior to each lecture
Laboratory Assignments: As indicated in the "other required materials" section above, students will download lab assignment outlines from OWL. It is the responsibility of each student to download and print his/her own copy of each
assignment prior to the relevant lab session.
Note: Labs for this course will start on Tuesday the week of Sept. 14-20, 2025, so there will be no need for you to attend labs until your first official lab period (Tues., Sept. 16 or Wed., Sept 17).

Delivery Format:

Lectures: In-Person
Lecture slides will be posted on OWL at least 24 before each lecture date indicated in the course schedule below (Course Schedule for ES2200A).

Labs: You will be attending one (1) lab session per week as per your assigned time according to your official course timetable (i.e., one of two sections – (Lab Sec. 002 (Tues. 2:30-5:30) or Lab Sec. 003 (Wed., 2:30-5:30 pm)).
Teaching Assistants: TBA

Lab preparation: It is recommended that students read lab assignments and complete as much of the lab they can before the lab sessions. The lab assignment outline for each lab will be posted at least 24 hours prior to the lab period on OWL Brightspace..

*Note: if you need to change the lab section you are officially registered in (according to the Office of the Registrar), you **must** ask your instructor for approval and make the change through the Office of the Registrar. This is because your TAs need to be able to keep track of exactly who is in each lab section. If approved, you must then confirm both your instructor and TAs of both sections of your intent to attenda different section.

Weekly Quizzes: Asynchronous Online (via Mastering Geology). Each week's quiz will open on Thursday at 12:00 am and will be due the following Thursday at 11:55 pm; see course schedule below). Each quiz will be based on material covered in the current and/or previous week's lectures.

Note on Learning Course Content: As with any university course, you are responsible for understanding **all** material presented in the lectures, so it is very important to attend all lectures and labs to read associated the supplementary material (e.g. e-text readings). Note that **some of the lectures cover topics that are treated only superficially in the text (and vice versa).** The exams will draw from material covered in the lectures, but the e-text readings, as well as exercises provided in Mastering Geology will provide additional background that will aid in the understanding of the concepts.

Course Schedule for ES2200A (2025)

Note: The following schedule is tentative and subject to change if deemed necessary by the instructor (keep track of any announcements regarding possible changes). The instructor will adhere to this schedule as closely as possible. However, there may be times in which a particular lecture is longer than anticipated and may therefore "overflow" into another (e.g. if a lecture is cancelled due to unforeseen circumstances such as a "snow day," if a longer time is needed to help everybody understand an important concept, or if an interesting discussion arises). Please be patient; we will do our very best to catch up if we do fall behind.
And just as a reminder: **Do not treat the slide handouts as a substitute for attending lectures! Doing so will be almost guaranteed to result in a significantly lower mark than desired.** Material covered on the midterm exam and Final Theory Exam will be based not only on textbook readings (and any additional homework readings assigned), but also material covered in the lectures themselves (which may not be covered in the readings). So it is in your best interests that you attend ALL lectures and labs. **Weekly online quizzes will be done via Mastering Geology**, so it is also important to visit that site to ensure you are aware of quiz deadlines.

Week	Day	Date of Lecture	Lecture Topics *(and Suggested Chapter Readings in "Earth" E-text)* Note lectures will be released and linked on OWL (in "Course Content" on the dates indicated. **E-text readings** should be done prior to attending the associated lectures.	**Mastering Geology Quizzes** (due by 11:55 pm on date indicated; always on Thursday).	**Lab Topics & Test / Exam Dates)**
Wk. 1 (Sept. 7-13)	M	Sept. 8	**Course Introduction: Fundamentals of Earth Sciences**		**No Labs**
	W	Sept. 10	**Minerals: The Building Blocks of Rocks**		
Wk. 2 (Sept. 14-20)	M	Sept. 15	**Minerals: The Building Blocks of Rocks, cont'd**	**Quiz 1** (Course Introduction and Minerals) **opens** Th., Sept. 18.	Lab this week: **Lab 1:** Mineral Properties & Identification ***Lead TA: TBA*** ***Assistant TAs: TBA***
	W	Sept. 17	**Igneous Rocks and Volcanism**		
Wk. 3 (Sept. 21-27)	M	Sept. 22	**Igneous Rocks and Volcanism, cont'd.**	**Quiz 1** (Course Introduction and Minerals) **due** Th., Sept. 25**.** **Quiz 2** (Igneous Rocks and Volcanism) **opens** Th., Sept, 25**.**	Lab this week: **Lab 1:** Mineral Properties & Identification, cont'd ***Lead TA: TBA*** ***Assistant TAs:TBA***
	W	Sept. 24	**Sedimentary Rocks**		
Wk. 4 (Sept. 28-Oct. 4)	M	Sept. 29	**National Day for Truth and Reconciliation (no class)**	**Quiz 2** (Igneous Rocks and Volcanism) **due** Th., Oct. 2 **Quiz 3** (Sedimentary Rocks) **opens** Th., Oct. 2	**No Labs this week.**
	W	Oct. 1	**Sedimentary Rocks, cont'd**		
Wk. 5 (Oct. 5-11)	M	Oct. 6	**Metamorphic Rocks**	**Quiz 3** (Sedimentary Rocks) **due** Th**.,** Oct. 9. **Quiz 4** (Metamorphic Rocks) **opens** Th., Oct. 9.	Lab this week: **Lab 2:** Igneous Rocks & Minerals ***Lead TA: TBA*** ***Assistant TA: TBA*** ***(Leah away)***
	W	Oct. 8	**Metamorphic Rocks, cont'd**		
Wk. 7 (Oct. 19-25)	M	Oct. 13	**Thanksgiving Monday (no classes)**	**Quiz 4** (Metamorphic Rocks) **due** Th**.,** Oct. 16. **Quiz 5** (Geologic Time) **opens** Th., Oct. 16**.**	Lab this week: **Lab 3:** Sedimentary Rocks & Minerals ***Lead TA: TBA*** ***Assistant TAs: TBA***
	W	Oct. 15	**Geologic Maps and Geologic Time**		
Wk. 7 (Oct. 19-25)	M	Oct. 20	**Geologic Maps and Geologic Time, con'td**	**Quiz 4** (Metamorphic Rocks) **due** Th**.,** Oct. 23. **Quiz 5** (Geologic Time) **opens** Th., Oct. 23**.**	Lab this week: **Lab 4:** Metamorphic Rocks & Minerals ***Lead TA: TBA*** ***Assistant TAs: TBA***
	W	Oct. 22	**In-class Midterm Lecture Exam 11:30 am- 12:20 pm (regular lecture room)**		
Wk.8	M	Oct. 27	**Deformation Processes and Structures**	**Quiz 5** (Geologic	**Midterm Lab Test** (Mineral and Rock

(Oct. 26 - Nov. 1)	W	Oct. 29	**The Ocean Floor and Associated Features**	Time) **due** Th., Oct. 30. **Quiz 6** (Structural Geology) **opens** Th., Oct. 30.	identification) in first hour; **Begin Lab 5:** Geologic Maps and Structures in remaining lab time. ***Co-Lead TAs: TBA split duties)*** ***Assistant TA: TBA***
Wk. 9 (Nov. 2-8)	M	Nov. 3	**Fall Reading Week**		
	W	Nov. 5			
Wk. 10 (Nov. 9-15)	M	Nov. 10	**The Evolution of Plate Tectonics**	**Quiz 6** (Structural Geology) **due** Th., Nov. 13. **Quiz 7** (Ocean Floor) **opens** Th., Nov. 13.	Lab this week: **Finish Lab 5:** Geologic Maps and Structures, cont'd ***Co-Lead TAs: TBA (split duties)*** ***Assistant TA: TBA***
	W	Nov. 12	**The Evolution of Plate Tectonics, cont'd**		
Wk. 11 (Nov. 16-22)	M	Nov. 17	**Isostasy and Mountain Building**	**Quiz 7** (Ocean Floor) **due** Th., Nov. 20. **Quiz 8** (Mountain Building) **opens** Th., Nov. 20	Lab this week: **Lab 6:** Oceanic Crust & Ophiolites ***Lead TA: TBA*** ***Assistant TAs: TBA***
	W	Nov. 19	**The Evolution of Continents**		
Wk. 12 (Nov. 23-29)	M	Nov. 24	**Mineral Resources**	**Quiz 8** (Mountain Building) **due** Th., Nov. 27. **Quiz 9** (Evolution of Continents) opens Th., Nov. 27.	Lab this week: **Lab 7:** Active Margins ***Lead TA: TBA*** ***Assistant TA: TBA***
	W	Nov. 26	**Mineral Resources, cont'd**		
Wk. 13 (Nov. 30 - Dec. 6)	M	Dec. 1	**Energy Resources**	**Quiz 9** (Evolution of Continents) **due** Th., Dec. 4. **Quiz 10** (Mineral Resources) opens Th., Dec. 4.	**Final Lab Test** (No lab this week)
	W	Dec. 3	**Energy Resources, cont'd**		
Wk. 14 (Dec.7 - Dec. 13)	M	Dec. 8	**Wrap up and Review, time permitting and/or question period in anticipation of December final exam**.	**Quiz 10** (Mineral Resources) **due** Th., Dec. 11. **Quiz 11** (bonus quiz) (Energy Resources) opens Th., Dec. 5 **(due Th., Dec. 18)**.	
Final Exam: Tentative TBA (see https://studentservices.uwo.ca/secure/Exams/)					

Key Sessional Dates

Classes begin: Thursday, September 4
Last day to add a full course or first-term half course (Friday, September 12)
Thanksgiving: Monday, October 13
Reading Week: November 3 to November 9
Last day to withdraw from a first-term half course without academic penalty: Monday, December 1
(Course withdrawals after this date will appear on a transcript with a grade of 'F').
Classes end: Tuesday, December 9

Contingency plan for an in-person class pivoting to 100% online learning
In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

4. Course Materials

Required Materials (Student to Purchase):

Textbook: Earth: An Introduction to Physical Geology, Updated 4th Canadian Edition (Tarbuck, Lutgens, Tsujita and Hicock, 2019) **with Mastering Geology**. Purchase directly from Pearson (pearson.com/mastering) with a credit card or PayPal or via purchase of an access code from the Western Book Store. Important Note: When registering for **Mastering Geology**, you **must use your Western email address as your Pearson Account username**. When prompted for **course id, use: tsujita69166** Further instructions on ordering and registering this Pearson product (Mastering Geology with e-text) are provided on OWL.

Lectures, lab assignments and other course materials: Other than the e-text and Mastering Geology, all essential course materials are made available on OWL (http://owl.uwo.ca)

Important Announcements, News and Updates: Students should check OWL (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. Students are responsible for checking OWL on a regular basis.

OWL Assistance: 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.

Technical Requirements:
As parts of this entire course are delivered online (e.g. Mastering Geology Quizzes) it is important to have a stable internet connection. If a health lockdown occurs, forcing all course material to be delivered online, a computer with working microphone and/or webcam will be essential.

5. Methods of Evaluation

Grading Scheme (and significant dates)
1) Weekly Lab Assignments (20%) Due at the end of each lab session
2) In-Class Midterm Lecture Exam (15%)* Wednesday, Oct. 22, 2025 (11:30 am)
3) Midterm Lab Test (10 %) Tues. Oct. 28 / Wed. Oct. 29, 2025 (1st hour of lab session)
4) Final Lab Test (15%) Tues., Dec. 2 / Wed., Dec. 3, 2025 (Regular lab time)
5) Final Lecture Exam (35%) During the December exam period (TBA)
6) Mastering Geology Quizzes (5%)** Due 11:55 pm, Thursday of each week

Make-up policy: Labs must be made-up before the next lab period unless special arrangements are made. The policy for scheduling a special lab test/exam or lecture exam is indicated in the Western University Academic Calendar.
Due dates: Minus 10% per day for late for the weekly lab assignments. If exceptional circumstances prevent you from handing in a lab on time, please contact both the managing TA and the Instructor (Cam Tsujita).

Online (Mastering Geology) quizzes
For the purpose of encouraging everyone to stay "on track" in learning the subject matter as it is covered, **online quizzes will be completed (via Mastering Geology)** by students on a weekly basis. There will be a total of 11 quizzes over the course of the term. For each of the weeks indicated above, you will complete the quiz by **11:55 pm on the date indicated above (which will always be a Thursday).** Each quiz will be based on the lecture content covered the previous week. You will have approximately one week (and three (3)) attempts within this time to do each question of each quiz (so you can re-answer any questions you have answered incorrectly). Provided that you have done the e-text readings and have viewed the lecture videos, it should be pretty easy to get good marks in these quizzes. Quizzes submitted after the deadlines indicated will be immediately deducted 10%, then an additional 10% for each subsequent day (24 hours) late). **Your quiz mark for the term (10%) will be the average mark of your best 10 (of 11) quizzes.**

Laboratory Assignments: Laboratory assignments will be provided as downloadable pdf files on OWL. You will be required you to print out the worksheets (which will be handed in for marking). Note: Labs for this course will start on the week beginning Sept. 1), so there will be no need for you to attend labs up until that week. Lab assignments will be directly handed in to presiding TA at the end of the lab session. **Lab assignments handed in late will be deducted 10% of the assignment grade for each day late.**

If you miss, or anticipate missing, a lab due to medical (or other legitimate reasons), report your absence to the head (instructional) TA of the relevant lab to arrange an alternate date to complete and submit the assignment(s). If you miss a lab test/exam, report to Academic Counselling with documentation for recommendation of Academic Accommodation (if approved, arrangements for an alternate date to write a make-up test/exam. Also advise your instructor of your absence.

Format for Midterm and Final Lecture Exams: Both exams will consist of a combination of multiple choice & written answer questions. The Midterm (Lecture) Exam will be 50 minutes long and the Final (Lecture) Exam will be 3 hours long.

General Information About Missed Course Work
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.

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. This will apply to Mastering Geology Quizzes and Lab Assignments which will be dealt with directly by the Instructor and Teaching Assistants (vs. Academic Advising).

However, the following assessments are excluded from this, and **therefore always require formal supporting documentation**:

- Examinations scheduled during official examination periods (i.e. Final Lecture Exam) (Defined by policy)
- Practical laboratory tests (Midterm and Final Lab Tests) (Defined by policy)
- Midterm examination (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above, the request cannot be recalled and reapplied. This privilege is forfeited.

Evaluation Scheme for Missed Assessments

When a student misses the Final Exam and their Academic Consideration has been granted by Academic Advising, 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.

Essential Learning Requirements

Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade.

Note that **you must pass** both the **lecture portion** (combined mark for quizzes, online participation, midterm exam, final exam**) and lab portion** (combined mark for lab assignments, and participation in OWL Forums). The **writing of both lecture (midterm and final) exams** and **both lab tests (midterm and final)** is also **mandatory in order to pass the course**, although it is still possible to pass the course with a failing grade in one or more of these assessments. A passing grade for the course is 50% for all grade components combined.

Where legitimate Academic Considerations are granted for a student, that student will not be penalized for failing to meet a specific requirement. For example, a student who misses one or more labs or quizzes due to illness will be given an opportunity to complete the affected assessments after they recover. For the Final Lecture Exam specifically, it may be permissible for the opportunity to write a makeup to be granted with the next offering of the course, in which case the student will receive a grade of Incomplete (INC) until they complete their course requirements.

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.

Electronic devices are permitted for Lab Assignments and Mastering Geology quizzes. However, such devices **will not be permitted on any in-person tests and exams** (e.g Lab Tests, Midterm Lecture Exam and Final Lecture Exam).

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.

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.

In the event of health lock-down, tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

https://remoteproctoring.uwo.ca.

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/.

This course is supported by the Science Student Donation Fund. If you are a student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students' Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course, including rock and mineral samples and mineral testing equipment. You may opt out of the Fee by the end of September of each academic year by completing the online form linked from the Faculty of Science's Academic Advising site. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the Chair of the Department or email the Science Students' Council at ssc@uwo.ca.