

Earth Sciences 2240F Course Outline

Catastrophic Events in Earth History

Fall 2025

1. Course Information

Earth Sciences 2240F considers those events so dramatic and catastrophic that they leave evidence in the geologic record and can threaten life on Earth. Included will be violent volcanic eruptions, mega-earthquakes and tsunamis arising from them, rapid climatic changes and associated storms, and impacts from asteroids and comets. As much as possible, we will use the examples of recent events and processes to help interpret what we read in the rock record.

The content of the course incorporates definitions of basic geologic terminology and concepts required to proceed irrespective of background knowledge.

Course Learning Objectives

- The primary goal of this course is to gain an understanding of those (predictable and unpredictable) events that catastrophically punctuate the normal evolution of Earth.
- We will learn what energy sources fuel Earth's processes in rocks, water and atmosphere, and what factors turn ordinary processes into extraordinary ones.
- We will learn the significance of geologic time and we'll learn how to read dates incorporated in ice, sediments and rocks.
- We will learn to write scientific reports; an assigned topic will be researched and presented in scientific format.

List of Prerequisites

Pre-requisites: Completion of first year requirements.

Anti-requisites: Earth Sciences 2241A/B

Unless you have either the prerequisites for this course or written special permission from the Department of Earth Sciences to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record.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

Instructor: Dr. Sheri Molnar

Contact: smolnar8@uwo.ca

Students must use "ES2240" in the email subject and use their Western (@uwo.ca) email addresses when contacting the instructor. As this is an online course, the instructor does not hold in-person office hours. Emails will be responded to within typical weekday working hours.

3. Course Schedule

Suggested Weekly Schedule

- This schedule is based upon a 12 week duration; the Fall term is 13 weeks.
- The suggested schedule amounts to understanding **18 to 25 pages per week**.
- You will have to follow this schedule closely for the first half of the term in order to read all of the material that will be tested on the midterm in time.
- There is an extra week at the end of term that will allow you to be flexible in your readings in the second half of the term in order to accommodate the writing of your scientific report. If you follow this schedule exactly you will finish the readings one week before the end of term.

PART A: BASIC CONCEPTS AND PROCESSES	
UNIT 1: INTRODUCTION TO NATURAL PROCESSES	
Week 1, Sept 8-12	Unit 1 Introduction: The Scientific Method; Terminology Chapter 1: Philosophy of Interpretation: Catastrophism vs. Gradualism Chapter 2: Geological Age Dating <i>Graded quiz for Unit 1</i>
UNIT 2: PROCESSES DRIVEN BY INTERNAL ENERGY	
Week 2, Sept 15-19	Unit 2 Introduction: Earth's Differentiation; Internal Heat Energy Chapter 3: Plate Tectonics <i>Graded quiz for Introduction and Plate Tectonics</i>
Weeks 3-4, Sept 22 – Oct 3	Chapter 4: Earthquake Basics Chapter 5: Megathrust Earthquakes and Tsunami Chapter 6: Transform and Intraplate Earthquakes <i>Graded quiz for Earthquakes and Tsunami</i>
Weeks 5-6, Oct 6-17 (Thanksgiving on Mon. Oct 13)	Chapter 7: Volcanoes: The Basics Chapter 8: Killer Volcanoes Chapter 9: Flood Basalts <i>Graded quiz for Volcanoes</i>
Mid-term Exam (2 hour duration), Sunday Oct. 19 starting at 1pm [online]. Covers content to end of Chapter 9.	
UNIT 3: PROCESSES DRIVEN BY EXTERNAL ENERGY	
Week 7, Oct 20-24	Unit 3 Introduction Chapter 10: Physics and Chemistry of Air and Water
Week 8, Oct 27-31	Chapter 11: Cyclonic Storms <i>Graded quiz for Air, Water and Storms</i> Chapter 12: Climate Basics Chapter 13: Climate: Past, Present, Future <i>Graded quiz for Climate</i>
Week 9, Nov 3-7 (Fall Reading Week)	
Week 10, Nov 10-14	Chapter 14: Space Impacts Basics Chapter 15: Space Impacts Case Studies <i>Graded quiz for Space Impacts</i>

PART B: GLOBAL CATASTROPHES THAT CAUSED EXTINCTIONS	
UNIT 4: MASS EXTINCTIONS	
Week 11, Nov 17-21	Unit 4 Introduction: The Geological Time Scale; Potential Causes of Mass Extinctions Chapter 16: Precambrian Time Chapter 17: A Trip through the Phanerozoic <i>Graded quiz for Chapters 16 and 17</i>
Week 12, Nov 24-28	Chapter 18: End-Permian Mass Extinction: When Life was Nearly Extinguished Chapter 19: End-Cretaceous Mass Extinction: Death to the Dinosaurs! Chapter 20: Humans and the Holocene Extinctions <i>Graded quiz for Chapters 18, 19 and 20</i>
Non-Cumulative End-of-Term Exam (2 hour duration) [online], Date and Time determined by Registrar's Office. Content from the Unit 3 Introduction (week 7) to end of Chapter 20, inclusive.	

Key Sessional Dates

Classes begin: September 4, 2025

(non-instructional day) National Day for Truth and Reconciliation: September 30, 2025

Mid-term Exam, Sunday Oct. 19 2025 at 1pm.

Make-up Mid-term Exam, Saturday Nov. 1 2025 at 1pm.

(non-instructional days) Fall Reading Week: November 3 – 9, 2025

Exam period: December 11 – 22, 2025

4. Course Materials

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

Course content was originally developed by Dr. Neil MacRae and updated by Drs. Liz Webb and Sean Shieh in previous versions of ES2240.

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

20% Mid-Term Examination

25% non-cumulative End-of-Term Examination

40% Scientific Report (2 assignment parts due Oct. 7 and Dec. 2 [course essay requirement])

15% nine Quizzes on course content

20% Mid-Term (2 hour) written examination [online]

The Mid-Term Examination covers the first half of the course: Unit 1 and Unit 2 inclusive (to end of Chapter 9). Typically ~30 multiple choice questions, ~10 fill-in-the-blank questions and ~5 short answer questions.

Date and Time: Sunday, Oct. 19 2025 at 1pm

For online examinations, students are not permitted access to any additional materials.

The instructor must receive an academic consideration notification (either with or without supporting documentation) within 48 hours of the scheduled mid-term examination for the student to be permitted and scheduled to take the make-up mid-term exam. This is the mechanism to identify those students that need to write the make-up mid-term exam. See section 6.1 about submitting an academic consideration request.

Make-up Mid-Term Examination [online] will occur on **Saturday, Nov. 1 2025 at 1pm**

Students that miss writing the make-up mid-term exam must submit an academic consideration request with supporting documentation within 48 hours of the scheduled make-up mid-term exam. The instructor has designated the make-up mid-term exam as the one assessment in this course that requires academic consideration with supporting documentation (again, see section 6.1).

Students that miss writing both the mid-term and the make-up mid-term (with supporting documentation) will write the mid-term the next time the course is offered (usually the next term).

25% End-of-Term (2 hour) written examination [online]

The End-of-Term examination is non-cumulative, covers the second half of the course: Unit 3 & Unit 4 inclusive (from Unit 3 Introduction to end of Chapter 20). Similar format as the mid-term exam.

Date and Time: To be determined by the Registrar's office

For online examinations, students are not permitted access to any additional materials.

Make-up End-of-Term Exam [online]: **To be announced, determined by Registrar's office**

You can only take the make-up End-of-Term ("special") Exam with permission from an academic counsellor.

If you miss the End-of-Term Exam, please contact the Academic Counselling 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). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination 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.

You may be eligible to write the Make-up End-of-Term 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). Students who have any of these type of conflict(s) and who wish to explore alternative scheduling options, should submit an exam conflict through the [Student Absence Portal](#).

40% Scientific Report (of an assigned research topic) Submitted in 2 Parts

10% Assignment 1 – Draft of Introduction and Reference list, **Due Tues. Oct. 7 @ 1pm**

30% Assignment 2 – Final Scientific Report (2500 words), **Due Tues. Dec. 2 @ 1pm**

The assigned research topic and further detailed assignment information and instructions will be provided on the OWL course site.

This is an essay course, a passing grade on assignment 2's final scientific report (the 30%) is required to pass the course (see section 6.1). In other words, students must submit a final scientific report (not optional).

About Submission and Due Dates of Scientific Reports

- Reports are submitted as OWL “Assignments”. It is best to upload your assignment reports in two formats: a MS Word document (to generate the Turnitin result) and a PDF (to preserve your report's formatting).
- When you submit an assignment you will receive an email receipt from OWL and an email receipt from Turnitin.com. **Keep these for your records.**
 - Turnitin.com is the software that Western uses to check submitted work for plagiarism. This software compares your report to everything that has been published, everything on the internet, and all other student papers that have been previously submitted to Turnitin (from any university).
 - **Please Note:** It can take several minutes, several hours or even a day for Turnitin to generate a report and you will not be allowed to resubmit an assignment while Turnitin is generating the report. **Hence, you should not submit an unfinished draft close to the deadline in case your Turnitin result is delayed and you are not able to submit your final version before the deadline.**
- The “**Due Dates**” recorded on the syllabus (*and in the OWL Calendar*) are the final dates of submission without penalty.
 - No late penalty for reports submitted within the first hour after the deadline.
 - Reports submitted within 1 - 4 hours after the deadline will receive a 2% penalty.
 - Reports submitted within 24 hours after the deadline will receive a 5% penalty.
 - On the 2nd, 3rd, and 4th days after the **Due Date**, reports may be submitted but will be subject to a late mark deduction of 15%, 25%, or 35%, respectively. Each ‘day’ starts at the 1pm **Due Date** time (not midnight).
 - No reports will be accepted 5 days after the **Due Date**. This means that on and after the 5th day after the **Due Date**, the assignment grade is a 0.
 - Extensions will not be granted because *you* have a time problem on the Due Date; it's up to *you* to manage your time and get the report assignments submitted. Meaning students should not submit an academic consideration request without documentation, it will be **denied**.
 - If you require an extension for a legitimate medical or personal reason (e.g. physical illness or extreme stress), please get documentation from your doctor and take it to an academic counsellor in your home faculty to submit an academic consideration request with documentation.

15% Graded Quizzes (9 quizzes at intervals during the course; see *Weekly Schedule* above)

Graded quizzes may be attempted / submitted **at any time**. It makes sense to do them as you go, at the end of each chapter or section to which they apply. The quiz settings are set to **one attempt only** with unlimited time; Once submitted, the grade and incorrect questions (without answers) will be displayed/provided to you.

The date for students to complete all quizzes is three days prior to Fall term end, **Dec. 5 2025**. A three day grace period (plus a weekend) is provided to students to complete all quizzes without penalty by the last day of Fall term classes, **Dec. 9 2025**.

- Extensions will not be granted because *you* have a time problem on the Due Date; it's up to *you* to manage your time. Meaning students should not submit an academic consideration request without documentation, it will be **denied**.
- If you require an extension for a legitimate medical or personal reason (e.g. physical illness or extreme stress), please get documentation from your doctor and take it to an academic counsellor in your home faculty to submit an academic consideration request with documentation.

6. Additional Statements

Note that the instructor owns the IP in the lecture and lecture materials even when such lectures or materials are posted online and students are not to post lectures or lecture materials to any other websites or platforms or use the lecture recording or materials for any other purpose without instructor consent.

6.1 Missed Coursework / Student Absences

Students who experience an extenuating circumstance sufficiently significant to temporarily render them unable to meet academic requirements (e.g., illness, injury) may submit a request for academic consideration.

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

- **Make-up Mid-Term Examination** (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)
- **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, the request cannot be recalled and reapplied. This privilege is forfeited.

6.2 Essential Learning Requirements

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

- a passing grade on essays or lab reports (i.e., assignment #2's full scientific report) in a course designated as an "essay course" (i.e., with a suffix of E, F, G, or Z) to satisfy the Senate requirement that students must demonstrate "some minimal competence in essay writing" in order to pass the course.

The consequence of not meeting the above requirement (a grade of 49 or lower on assignment 2's full scientific report) is the student would not pass (would fail) the course.

6.3 Use of Generative AI Tools

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, scientific reports, quizzes, and final examinations.

Using such tools for content generation, report 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.

6.4 Religious Accommodation

When conflicts arise 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 of 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>

6.5 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.

6.6 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

6.7 Scholastic Offences

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://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

Plagiarism detection software

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 quizzes and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Use of Electronic Devices During Assessments

The possession of unauthorized electronic devices during written 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.

You may use a calculator provided it cannot connect with the internet (i.e., not permitted to use calculator app on a smart phone). It is your responsibility to review and comply with these expectations.

Remote Proctoring

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>.

6.8 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 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.

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/>.