

SYLLABUS
Earth Sciences 2240F
Catastrophic Events in Earth History

1. Instructor Information

Instructor: Dr. Sean Shieh B&GS room 1066
Contact: sshieh@uwo.ca
Personal questions should be emailed to the instructor.

2. Course Description

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 the tsunami 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.

3. Prerequisites

Prerequisites: Completion of first year requirements.
Antirequisites: Earth Sciences 240A/B, 241A/B, 2241A/B

Unless you have either the requisites for this course or written special permission from your Dean 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.

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. Textbook and course materials

The course is offered *on-line only*. You can access the course material on the UWO OWL Sakai system: <https://owl.uwo.ca/portal>

Course content was primarily developed by Prof. Neil D. MacRae in previous versions of 2240. All course contents are on-line; neither texts nor supplemental materials are required.

5. Suggested Weekly Schedule

- This schedule is based upon a 12 week duration, but the term is 13 weeks.
- The suggested schedule amounts to **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

- **Introduction:** The Scientific Method; Terminology
- **Chapter 1:** Philosophy of Interpretation: Catastrophism vs. Gradualism
- **Chapter 2:** Geological Age Dating

Graded quiz for Unit 1

Unit 2: Processes Driven by Internal Energy

Week 2

- **Unit 2 Introduction:** Earth's Differentiation; Internal Heat Energy
- **Chapter 3:** Plate Tectonics

Graded quiz for Introduction and Plate Tectonics

Weeks 3-4

- **Chapter 4:** Earthquake Basics
- **Chapter 5:** Megathrust Earthquakes and Tsunami
- **Chapter 6:** Transform and Intraplate Earthquakes

Graded quiz for Earthquakes and Tsunami

Weeks 5-6

- **Chapter 7:** Volcano Basics
- **Chapter 8:** Killer Volcanoes
- **Chapter 9:** Flood Basalts

Graded quiz for Volcanoes

Mid-term Exam (2 hours); Covers content to end of Chapter 9

Unit 3: Processes Driven by External Energy

Week 7

- **Unit 3 Introduction**
- **Chapter 10:** Physics and Chemistry of Air and Water

Week 8

- **Chapter 11:** Cyclonic Storms
- Graded quiz for Air, water and Storms*
- **Chapter 12:** Climate Basics

Week 9

- **Chapter 13:** Climate: Past, Present, Future
- Graded quiz for Climate*

Week 10

- **Chapter 14:** Space Impacts Basics
 - **Chapter 15:** Space Impacts Case Studies
- Graded quiz for Space Impacts*

Part B: Global Catastrophes that Caused Extinctions

Unit 4: Mass Extinctions

Week 11

- **Introduction:** The Geological Time Scale; Potential Causes of Mass Extinctions
- **Chapter 16:** Precambrian Time
- **Chapter 17:** A Trip through the Phanerozoic

Graded quiz for Chapter 16 and 17

Week 12

- **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

Graded quiz for Chapters 18, 19 and 20

Final Exam (2 hours); Content from the Unit 3 introduction to Chapter 20, inclusive.

6. Method of Evaluation

- 20% Mid-Term 2 hour written examination

Midterm Exam :

- Time and location(s): TBA**

- *This covers the first half of the course :Unit 1 and Unit 2 inclusive (to end of Chapter 9)*
- **Make-up midterm will be held at Western Campus ONLY**
You can only take the make-up exam with permission from an academic counsellor.

- 30% End-of-Term 2 hour written examination
Date, time and location to be determined by the Registrar's office
 - *This covers the second half of the course: Units 3 & 4 inclusive (to end of Chapter 20)*
 - Make-up final exam: TBA
You can only take the make-up exam with permission from an academic counsellor.

- 40% Scientific Report (Assigned Research Topic) Submitted in 2 parts:
See the Assignment Information provided on OWL
 - 10% Draft of Introduction and Reference list **Due TBA**
 - 30% Final report (2500 words) **Due TBA**

- 10% Graded Quizzes (at intervals during the course; see *Weekly Schedule*)
The quizzes must be completed by **the last date of semester.**

Notes

- The “**Due Dates**” recorded on the syllabus (*and in the OWL Calendar*) are the final dates of submission without penalty.
- If you have technical difficulties submitting an assignment contact the instructor immediately.
- Assignments submitted within two hours of the deadline will receive a 2% penalty.
- For 5 days following those “**Due Dates**” (including weekend days) reports may be submitted, but will be subject to a mark deduction of 10 % per late day. No reports will be accepted after that.
- 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.**
- Graded quizzes may be attempted/submitted at any time, but **MUST** be submitted by the last day of classes (*NOT the day of the exam*). It makes sense to do them as you go, at the end of each section to which they apply.

7. Additional Statements (PLEASE READ)

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 your consent.

7a. Student Absences

Academic Consideration for Student Absences

Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- (i) Submitting a Self-Reported Absence (SRA) form provided that the conditions for submission are met. To be eligible for a Self-Reported Absence:
 - an absence must be no more than 48 hours
 - the assessments must be worth no more than 30% of the student's final grade
 - no more than two SRAs may be submitted during the Fall/Winter term
- (ii) For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.
- (iii) Submitting appropriate documentation for non-medical absences to the Academic Counselling office in their Faculty of Registration.

Note that in all cases, students are required to contact their instructors within 24 hours of the end of the period covered, unless otherwise instructed in the course outline.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the policy on Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs, see:

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

and for the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Absences from Final Examinations

If you miss the Final 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).

You may also be eligible to write the Special 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).

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. See the Academic Calendar for details (under [Special Examinations](#)).

7b. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD), 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,

7c. Academic Policies

The website for Registrarial Services is <http://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 his/her official university address is attended to in a timely manner.

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:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.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>).

Statement on Use of Electronic Devices: During exams electronic devices (e.g. computers, phones) will not be allowed. You may use a calculator provided it does not connect with the internet (e.g. no calculator apps on your phone).

Multiple Choice: Computer-marked multiple-choice tests 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

Remote proctoring: 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>.

7d. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling 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/>.

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 (519) 661-2147 if you have any questions regarding accommodations.

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/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.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.

Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/mentalhealth>) for a complete list of options about how to obtain help.

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