

SYLLABUS
Earth Sciences 2240G
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 2240G 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.

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 content is 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 : February 27, Saturday
- Time and location(s): 9:00am at Health Sciences Building room 40**
 - *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 4 parts:
See the Assignment Information provided on OWL
 - 10% Review of two scientific papers **Due Tuesday February 2, 1:00 pm**
 - 5% Reference list **Due Tuesday February 23, 1:00 pm**
 - 5% Draft of Introduction **Due Tuesday March 1st, 1:00 pm**
 - 20% Final report (2500 words) **Due Tuesday March 22, 1:00 pm**

- 10% Graded Quizzes (at intervals during the course; see *Weekly Schedule*)
 The quizzes must be completed by **Wednesday April 6th, 11:59 pm.**

Notes

- The “**Due Dates**” recorded on the syllabus (and *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)

Accessibility Statement: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

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).

Statement on Academic 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:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Plagiarism is a serious academic offence. The UWO Senate Academic Handbook defines plagiarism as "The act of appropriating the literary composition of another, or parts or passages of his writings, or the ideas or language of the same, and passing them off as the product of one's own mind." Students must write their assignments in their own words.

Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using proper referencing such as citations. For more information see Scholastic Offence Policy in the Western Academic Calendar.

Plagiarism detection software: All required papers will 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>).

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

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

SDC's Learning Skills Services: Rm 4100 WSS, <http://www.sdc.uwo.ca/learning>
LS counsellors are ready to help you improve your learning skills. We 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.

Student's responsibilities in the event of a medical issue or missed exam/assignment:
If you are unable to meet a course requirement due to illness or other serious circumstances, **you must provide valid medical or other supporting documentation to the Dean's office as soon as possible** and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. You can learn more about the University Policy on Accommodation for Medical Illness online through the Student Center.