

Earthquakes & Volcanoes

GEOS 105

Spring 2025



LECTURE: MWF (11:30 – 12:30am MWF)

Room: JSC 223

Instructor: Dr. Ken Brown

Email: kennethbrown@depauw.edu

Phone: 765.658.6767

Office: Julian 213

Office Hours: MWF (11:30am–12:30am) or by appointment

Textbook: *Natural Hazards and Disasters* (5 ed.) – Hyndman, D. and Hyndman, D. (rent the book)

Open Source Textbook: <https://openpress.usask.ca/physicalgeology/>

COURSE DESCRIPTION

This course is an introduction to the exciting world of earthquakes and volcanoes and the geologic processes that form these natural hazards. Utilizing plate tectonic theory, this course will explore the causes, the distribution, and the impact these natural hazards have globally. By taking this course, students will gain a greater appreciation for natural hazards, the scientists that study these phenomena, and the scientific thinking necessary to mitigate the impacts of these hazards on society. Although this course is primarily a lecture-based course, students will have opportunities to participate in short hands-on activities/discussions and watch videos about historical earthquakes and volcanic eruptions.

PRIMARY COURSE OBJECTIVES: At the end of this course, students will be able to:

1. Apply the scientific method to study Earth materials, processes, and features.
2. Describe the processes operating at and beneath the Earth's surface and explain how those processes form earthquakes and volcanoes.
3. Use appropriate concepts and terminology to describe geologic features and phenomena.
4. Explain how humans are impacted by the Earth and its environment, its resources, and its processes.
5. Outline modern, scientific approaches used to predict, forecast, and assess natural hazards.

BASIC STUDENT RESPONSIBILITIES - It is your responsibility/expectation to....

- *Enjoy the learning process and remain open-minded*
- *Read, understand, and abide by all of the policies established in this syllabus and Student Handbook*
- *Know when all important assessments and exercises are due*
- *Complete assessment and assignments by their respective due dates/deadlines*
- *Attend class, participate in activities, and engage with materials both inside/outside of class**
- *Check your email DAILY for updates and announcements.*
- *Attend office hours and ask questions when you don't understand content or directions.*

Tips for Success: *Want to do well in this course? Here's how:*

- *Attend all of the classes and ask questions during class (or immediately after class).*
- *Stay engaged, listen, and take good notes during class. Don't use your laptop/phone in class.*
- *Be proactive about studying/reviewing content outside of class – spend at least 3-4 hours a week reviewing lecture content on your own (or with a classmate or group of classmates).*
- *Your instructor has already posted lots of resources in Moodle – Use them! (e.g., syllabus calendar, lecture slides, review sheets, lecture handouts, textbook chapters, etc.)*
- *Every point counts - so take time to prepare for class, the weekly quizzes, and the exams.*

GRADING*

Syllabus Quiz	20 pts
Exam 1	100 pts
Exam 2	100 pts
Exam 3	100 pts
Weekly Quizzes	8 @ 10pts = 80pts
Total points:	400 pts*

**It is your responsibility to regularly check with your instructor about your progress in the course*

Letter Grade	Percent Range
A	100.00 - 93.00
A-	92.99 - 90.00
B+	89.99 - 87.00
B	86.99 - 84.00
B-	83.99 - 81.00
C+	80.99 - 78.00
C	77.99 - 75.00
C-	74.99 - 72.00
D+	71.99 - 69.00
D	68.99 - 66.00
D-	65.99 - 63.00
F	<62.99

STUDENT FEEDBACK: Timely feedback is essential to student learning. Thus, I will strive to provide feedback on your submitted work in a timely manner, offering constructive comments and ways to improve.

ATTENDANCE/PARTICIPATION: Attendance is required and is important to your success in this course. Students are expected to attend class, and while in class, refrain from any activity that could interfere with the learning experience of others. It is common for students to face challenges (e.g., academic, medical, spiritual, or emotional) that result in absences. *If you have to miss class, please let me know. You will be responsible for all of the content (and announcements) that you missed during your absence.* Course slides are posted in Moodle for your convenience. You may be administratively withdrawn from the course if you miss more than 25% of the class.

SYLLABUS QUIZ: Understanding course expectations and student responsibilities are important for any student enrolled in a university course. As such, students will complete a brief quiz during the first week of classes that acknowledges course responsibilities and expectations. Upon reading the syllabus, you will need to complete this quiz in Moodle. *The due date is outlined in the lecture calendar.*

EXAMS: Exams evaluate your understanding of fundamental concepts/vocabulary and your ability to apply these concepts to solve applied problems. Although exams are not comprehensive, the concepts found in one section/chapter may require you to have a working knowledge of previous concepts and vocabulary. If it is covered in the lecture slides, reading assignments, or class discussions/activities, you are responsible for knowing it. The final exam may not be taken early. No make-up exams will be given without proper approval. Approved make-up exams are taken during office hours. If you have university accommodations, please contact your instructor. *Exam dates are outlined in the calendar.*

WEEKLY QUIZZES: Quizzes are designed to help you determine how well you understand that week's material. These low-stake quizzes help you recognize areas of weakness/strength in your learning. There are 8 quizzes (all weighted equally - 10pts each). *Quizzes are completed in Moodle (available from Friday – Sunday 11:59pm) unless noted otherwise in the syllabus calendar.* If you fail to complete a quiz, the missed quiz's score will be replaced with your next exam's score. Thus, this policy allows you to miss one quiz during the semester. Quizzes are linked to course objectives #1- #5.

IN-CLASS DISCUSSIONS/ACTIVITIES: Class discussions and activities are designed to: 1) supplement lectures; 2) facilitate student interactions with each other; 3) permit questions to be answered about the course content; 4) explore selected course topics in more depth; and 5) offer opportunities to have hands-on learning. *You are expected to join AND participate in these discussion sessions/activities. Please note - content from discussions and activities may be found on quizzes and exams!* Class discussions/activities are linked to course objectives #1- #5.

ADDITIONAL POLICIES AND INFORMATION:

EMAIL: Please email your instructor if you have questions or would like to meet during office hours. *Emails sent after 5pm may not receive a response until the next day. Emails sent after 5pm on Friday may not receive a response until the following weekday (Monday). Please respect this policy and plan accordingly.*

Copyright Policy: All materials provided to you are copyrighted. None of the course materials may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without prior written permission.

Diversity, Equality, & Inclusivity:

“A university is a place where the universality of the human experience manifests itself” – Albert Einstein. In keeping with Einstein’s viewpoint, the Geosciences program at DePauw is committed to providing an inclusive environment of learning and living that is open to all people and perspectives. It is the policy and practice of this course and its instructor to create a welcoming environment for all students as well as to address students in accordance with their personal identities. In this course, you will be encouraged to remain open to information, ideas, and experiences shared by other students. For more information about diversity and inclusion at DePauw, please use the following link:

<https://www.depauw.edu/studentacademiclife/cdi/>

ADA Accommodations:

It is the policy and practice of DePauw University (and this instructor) to strive to support the student experience and to provide reasonable accommodations for all students. If you are eligible to receive an accommodation and would like to request it for this course, please contact student disability services. Allow one week advance notice to ensure enough time for reasonable accommodations to be made. Accommodations are not retroactive. Students who have questions about student disability services or who have, or think they may have, a disability (psychiatric, attentional, learning, vision, hearing, physical, medical, etc.) are invited to contact student disability services for a confidential discussion in union building suite 200 or by phone at 765-658-6267 (studentaccessibility@depauw.edu).

Inclusivity in the Geosciences:

Geoscientists address increasingly challenging problems that confront a growing human population: climate change, dwindling resources, earthquake prediction and natural hazard identification, environmental concerns, and safe disposal of waste materials. Because the Earth is our only home, the geosciences promote stewardship of the environment and Earth’s finite natural resources, therein creating a deeper sense of social/civic responsibility that transcends all races, cultures, ages, and identities. As such, there are many professional communities that support the intersectionality of students within the geosciences. I would be happy to connect you with these communities.

Use of AI and Academic Integrity Statement:

The use of AI in any form is not acceptable in this class. The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. Cheating, plagiarism, submission of the work of others, etc. violates DePauw’s policy on academic integrity. Lapses of academic integrity will be dealt with according to the policies set forth in the student handbook. If you are not sure what constitutes dishonest academic activities, please make sure you discuss any questions you may have with me. The policy and discussion of each student’s obligations and rights can be found in the Student Handbook. The policy is also available at: <http://www.depauw.edu/handbooks/academic/#Toc459018101>

As the instructor, I agree:	Your basic responsibilities as the student:
<ol style="list-style-type: none"> 1. To begin and end class at its scheduled time. 2. To respectfully answer questions about the subject matter (i.e. to respect all questions). 3. To accept questions before/after the class period and to respond to these accordingly. 4. To promptly notify students of any change made to the course. 5. To be approachable and respectful to students. 6. To provide timely and adequate feedback. 7. To meet with students that schedule office appointments. 8. To teach you fundamental geologic concepts and vocabulary relevant to Geoscience careers 9. To have fun while teaching this course! 	<ol style="list-style-type: none"> 1. Remain open-minded about course content 2. Attend our class meetings and be prepared for class activities/discussions 3. Refrain from any disruptive behavior (talking, texting, phone use, laptop use, etc.). 4. Email/visit your instructor if have questions. 5. Abide by all of the policies outlined in this syllabus and in-class. 6. Respect the opinions, ideas, and experiences shared by other students. 7. Complete all assignments and assessments by their respective due dates/ times. 8. Check your email daily for class announcements 9. Enjoy how cool science can be!

Teaching and Office Hours Schedule – Subject to Change

Dept. of Geology & Env. Geoscience; Spring 2025 Teaching/ Office Hour Schedule					
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00 AM					
9:10 AM 9:20 AM 9:30 AM 9:40 AM 9:50 AM					
10:00 AM					
10:10 AM 10:20 AM 10:30 AM 10:40 AM 10:50 AM	GEOL 105 LECTURE 10:20 - 11:20 AM	GEOS 320 LECTURE 9:40- 11:30 AM	GEOL 105 LECTURE 10:20 - 11:20 AM		GEOL 105 LECTURE 10:20 - 11:20 AM
11:00 AM					
11:10 AM 11:20 AM 11:30 AM 11:40 AM 11:50 AM	OFFICE HOURS 11:30 - 12:30 PM (or by appointment)		OFFICE HOURS 11:30 - 12:30 PM (or by appointment)		OFFICE HOURS 11:30 - 12:30 PM (or by appointment)
12:00 PM					
12:10 PM 12:20 PM 12:30 PM 12:40 PM 12:50 PM	GEOS 320 LECTURE 12:30- 1:30 PM		GEOS 320 LECTURE 12:30- 1:30 PM		GEOS 320 LECTURE 12:30- 1:30 PM
1:00 PM					
1:10 PM 1:20 PM 1:30 PM 1:40 PM 1:50 PM					
2:00 PM					
2:10 PM 2:20 PM 2:30 PM 2:40 PM 2:50 PM					
3:00 PM					
3:10 PM 3:20 PM 3:30 PM 3:40 PM 3:50 PM					
4:00 PM					

LECTURE CALENDAR *(subject to change)*

MONTH	WEEK	DAY	TOPIC	Reading/ Due Date	
JAN.	Week 1	27-Jan	-	<i>Read Syllabus & GSA Scientific Method Article</i>	BASIC GEOSCIENCE CONCEPTS
		29-Jan	-		
		31-Jan	-	Syllabus Quiz (by 11:59pm)	
FEBRUARY	Week 2	3-Feb	Introductions & Syllabus	<i>GSA Scientific Method Article</i>	
		5-Feb	Scientific Method	Chapter 1	
		7-Feb	Earth Basics - Earth Structure	Chapter 3, QUIZ #1	
	Week 3	10-Feb	Earth Basics - Earth Structure	Chapter 3	
		12-Feb	Plate Tectonics: Continental Drift	Chapter 4	
		14-Feb	Plate Tectonics: Theory & Evidence	Chapter 2; QUIZ #2	
	Week 4	17-Feb	Plate Tectonics: Plate Boundaries	Chapter 4	
		19-Feb	Plate Tectonics: Plate Boundaries (Continued)	Chapter 4	
		21-Feb	REVIEW SESSION		
	MARCH	Week 5	24-Feb	EXAM #1	
			26-Feb	Earthquake Basics: Processes & Fault Behavior	Chapter 12
			28-Feb	Visualizing Stick-Slip Behavior Activity	QUIZ #3
Week 6		3-Mar	Earthquake Basics: Stress-Strain & Fault Types	Chapter 12	
		5-Mar	Earthquake Basics: Earthquakes & Tectonics Settings	Chapter 12	
		7-Mar	Earthquake Basics: Seismometers & Seismograms	Chapter 4; QUIZ #4	
Week 7		10-Mar	Earthquake Basics: Seismic Energy	Chapter 12	
		12-Mar	Measuring Earthquakes: Intensity & Magnitude	Chapter 12	
		14-Mar	Locating Earthquake Epicenters & Activity	Chapter 4; QUIZ #5	
Week 8		17-Mar	SPRING BREAK		
		19-Mar			
		21-Mar			
Week 9		24-Mar	Common Earthquake Hazards	Chapter 12	
		26-Mar	Earthquake Prediction & Forecasting	Chapter 12	
		28-Mar	NO CLASS- GSA MEETING		
APRIL		Week 10	31-Mar	REVIEW SESSION	
			2-Apr	EXAM #2	
			4-Apr	NO CLASS	
	Week 11	7-Apr	Volcano Types: Shield Volcanoes & Cinder Cones	Chapter 11	
		9-Apr	Volcano Types: Stratovolcanoes & Calderas	Chapter 11	
		11-Apr	Volcano Basics: Magma-Forming Processes	Chapter 6; QUIZ #6	
	Week 12	14-Apr	Volcano Basics: Volcanoes & Plate Tectonics	Chapter 11	
		16-Apr	Volcanic Monitoring	Chapter 11	
		18-Apr	Volcanic Monitoring (Continued)	QUIZ #7	
	Week 13	21-Apr	Volcanic Products & Materials (Part I)	Chapter 11	
23-Apr		Volcanic Products & Materials (Part II)	Chapter 6; QUIZ #8		
25-Apr		TBD			
MAY	Week 14	28-Apr	Volcanic Hazards	Chapter 11	
		30-Apr	Volcanic Eruptive Styles	Chapter 11	
		2-May	Volcanic Eruptive Styles (continued)	Chapter 11	
	Week 15	5-May	Volcanic Eruption Activity		
		7-May	Prehistoric and Historic Volcanic Eruptions	Chapter 11	
		9-May	REVIEW SESSION		
	Week 16	12-May	EXAM #3 (Monday, May 12th; 8:30am - 11:30am)- Comprehensive		
					VOLCANIC HAZARDS
					VOLCANOES & VOLCANIC HAZARDS