Course Syllabus: Petrology

Kimbell School of Geosciences
GEOS 3234 Section 201/21A
Spring 2026

Contact Information

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Lab Teaching Assistant

Ms. Jordan Swearingen is an accomplished researcher of igneous and thermally metamorphosed rocks. She will assist with evaluation and execution of the laboratory.

Course Description

Petrology introduces students to the nature and origin of rocks, the solid materials of the Earth's crust and mantle. Students successfully completing the course will be able to identify common rocks by their macroscopic and microscopic properties. Moreover, students will understand natural crystallization, weathering, erosion, sedimentation, and lithfication processes and products, and their glorious relationship to the dynamic planet (strap in, it's a wild ride).

Students will:

- Understand the nature of rock and similar materials
- Learn the classification system based on texture, mineral/chemical composition, and association
- Examine rock-forming processes and environments.
- Discover the physical characteristics, chemical composition, and common origins of several dozen of the most common rocks.
- Learn the nature of crystallization, lithification, weathering, erosion, and soil formation.
- Recognize information about the origins and alteration of earth materials over time
- Discover the interconnections between lithospheric dynamics and rocks

Textbook & Instructional Materials

Recommended: Raymond, *Petrology* 2nd ed ISBN: 9781577665205
Recommended: Intro to the Rock-Forming Minerals Edition: 3rd edition ISBN: 9780903056274
Lab assignments will be disseminated online.

Thermodynamic

Because we live in universe seemingly consistent with these laws, and because I've noted that much of the policy in this document are a consequence of this, here are the four laws (to be covered in class).
0^{th}: Temperature is a consequence of thermal equilibrium among systems.
1^{st}: Energy can not be created or destroyed, but transferred among heat and work.
2^{nd}: Not all heat can be used for work, thermal energy is the product of temperature and entropy.
3^{rd}: Perfection is only possible in crystalline materials at absolute zero.

Academic Misconduct Policy & Procedures

Academic Dishonesty, which includes cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given), undermines the integrity of the class, the programs, and the university. Any infraction may be met with the minimal penalty of a zero credit on the evaluation. Further additional penalties, such as a failing grade for the course, or dismissal from the academic program will be applied at the discretion of the professor.
Additional guidelines on procedures in these matters may be found in the Student Handbook .

Artificial Intelligence

Large language models or chatbots (like ChatGPT) have recently grown in sophistication and accessibility. They can be useful tools to assist in drafting out writing or providing imaging, but they should be an assistance, not a substitute for your thought.
Earth Science is a beautifully diverse field; you need to find your own voice. Any creative input in this class is an opportunity to test and refine that; avoid shortchanging yourself the feedback you deserve by relying on AI.
Furthermore, AI isn't capable of independent insights, it is just matrix multiplication. The original ideas and contributions from others can be unacknowledged. Using an AI-content generator to complete coursework without proper attribution or authorization is a form of academic dishonesty. For this class, use of AI-content with appropriate citation is permitted (and some extra work is needed to correctly link AI-content to its sources).
Because AI "scrapes" the internet for information, and the internet is deeply flawed and woefully uninformed about petrology, anything generated by AI is inherently suspect. And overall, these models are not free: they engage in heavy electron work, producing thermal and power-generation wastes. Price's aphorism: *Before one uses AI, one should employ abundant "I."*

Grading

Grading follow the following points system and scheme.

Table 1: Points allocated to each class segment

Assignments	Points
Biweekly quizzes	150
Final examination	150
Assignments	350
Lab final	100
Project	150
Field Trip Assignment	100

Table 2: Total points for final grade.

Grade	Points	Percentage
A	900	>90%
B	800	80-90%
C	700	70-79%
D	600	60-69%
F	500	<60%

Assignment Submission

I will issue specific assignments in class and lab (mostly lab), and all are available on D2L. Completed work may be remitted to the professor or lab TA in person, through the prof's mailbox (BO 101), or by electronic submission. Burke-Kough Corollary: under the windshield wiper of my car is less than optimal – please use other submission sites.
Note: You may not submit a paper for a grade in this class that already has been (or will be) submitted for a grade in another course, unless you obtain my advance, explicit written permission and the permission of the other instructor.

Project Required

The term project requires the class to invent a game that teaches aspects of petrology. Game design and mechanic is up to the class. All are required to assist in its construction to receive full credit.

Bi-weekly Quizzes

Bi-weekly quizzes D2L cover the content as we go; these will be a little more extensive than those for mineralogy, but we will forgo the traditional midterm as a consequence. Do not miss these.

Final Exam

The class requires completion of a final examination. This will be an online offering through D2L, with a "take-home" style feel to it.

Field Trip

The class will travel to the Llano Uplift, the geographical, geological, and perhaps spiritual center of Texas. We leave on a Friday and return late Sunday. I've reserved a campsite at Inks Lake State Park and will provide transportation by van. The trip showcases all three rock types and provides a unique view on the assembly of the region.

Extra Credit

There may be extra credit for satisfactory completion of assigned extra tasks.

Late Work

Late assignments slow the grading down and therefore penalize the whole class. They will be provisionally accepted and at discounted credit. For most assignments, you will receive 10% of the grade for submitting your assignment on or before the prescribed time it is due. Late submissions, if accepted, will automatically lose that 10%.

Make Up Work/Tests

…but I would preface the above with "*I want you to learn. Completion is important!*" Please keep me appraised of absences and work with me to chart a route forward.

Colloquium

The Kimbell School of Geosciences hope to have three speakers on campus. Other relevant events may be noted. Attendance is required.

Important Dates

See academic calendar site: https://msutexas.edu/registrar/calendars.php

Desire-to-Learn (D2L)

Extensive use of the MSU D2L program is a part of this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into D2L through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

Attendance

As upper-level students, you should realize that it is common courtesy to let your instructor know of a pending absence. Rarely will I not excuse an absence if I'm

informed prior to the occurrence. More generally, you need to develop the habit of informing those impacted by your absence if you are to retain fruitful employment.

But don't show up ill – if you are sick, stay home. Absenteeism will be addressed on an individual basis, and the professor reserves the right to drop students with poor attendance.

Other Policies to Note

Petrology ranks among the most challenging classes within the undergraduate geoscience curriculum. It covers a number of abstract concepts. It incorporates attributes of inorganic chemistry and solid-state physics. It relies heavily on largely non-intuitive, frequently arcane, and always cumbersome nomenclature. In short, plan on spending a good portion of each week on this class.

Change of Schedule

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs.

Learning environment

Dr. Price is committed to providing an equitable and inclusive forum for learning and endeavors to keep this class a safe, open, and supporting space for all students. He is available and willing to address your issues and concerns. He also wants you to be aware of the following supporting structures that assist in this environment.

Student Engagement Center: cultivates "a sense of belonging for all students at MSU Texas by facilitating student access to critical resources and opportunities, supporting student success and advocating for constant improvement in the way we meet students' needs across our campus." https://msutexas.edu/student-life/engagement-center/index.php

Policies for general student complaints are available at https://msutexas.edu/student-life/dean/general.php. General student complaints should start with the informal process form https://cm.maxient.com/reportingform.php?MSUTexas&layout_id=4

Sexual misconduct is handled by the Title IX Coordinator, and misconduct information and reporting is https://msutexas.edu/titleix/

Anonymous complaints can be made through EthicsPoint: https://secure.ethicspoint.com/domain/media/en/gui/45483/index.html

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Clark Student Center, Room 168, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to Disability Support Services.

Campus Carry Rules/Policies

Refer to: Campus Carry Rules and Policies

Grade Appeal Process

Update as needed. Students who wish to appeal a grade should consult the Midwestern State University Undergraduate Catalog.

Notice

Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor. We are still adapting to the pandemic – anticipate changes and frequently check D2L for updates.

Proposed Schedule

Petrology GEOS 3234 - Topic Schedule for Spring 2026

Week	Day	Date	Topic	Text	Lab
1	W	1/21	Intro	1	RFMs, optics, and thins
	F	1/23	Parameters	1	none
2	M	1/26	Some missed minerals	none	none
	W	1/28	Time	none	Mafic rocks
	F	1/30	Igneous sources	2, 5	none
3	M	2/2	Magma mods	2, 5	none
	W	2/4	Phaneritic classification	3	Lunar Rocks
	F	2/6	Aphanitic classification	3	none
4	M	2/9	Physio-chemical constraints	4	none
	W	2/11	Physio-chemical diagrams	4	Phase diagrams
	F	2/13	Volcanic eruptions and products	none	none
5	M	2/16	Volcanic emplaced forms	none	none
	W	2/18	Intrusive forms	none	Ultramafic rocks
	F	2/20	Building the modern planet	none	none
6	M	2/23	Mantle, ultramafic rx, melting	5, 9	none
	W	2/25	Basalts, gabbros & cumulates	6	Felsic rocks
	F	2/27	Intermediate magmas	8, 10	none
7	M	3/2	Felsic magmas	7,10	none
	W	3/4	Felsic magmas	10, 11	Intermediate rocks
	F	3/6	Regional igneous	none	none
			Spring Break - Get Rowdy!		
8	M	3/16	Sediments	12, 15	none
	W	3/18	Sed chem constraints	none	Siliciclastic rocks
	F	*3/20*	Basins	15	none
9	M	*3/23*	No class meeting	none	none
	W	3/25	Weathering and soils	none	Carbonate rocks
	F	3/27	Siliclastics	16,17	none
10	M	3/30	Siliclastics	17	none
	W	4/1	Carbonates	19	Evaporitic rocks
	F	4/3	Easter Break		
11	M	4/6	Carbonates	19	none
	W	4/8	Evaporties and precipitates	20	Wichitas/Blanco Basin
	F	4/10	Field trip prep	none	none
T	Sat	4/11	Field Trip - Llano	none	none
	Sun	4/12	Field Trip - Llano	none	none
12	M	4/13	Field trip postscript	none	none
	W	4/15	Regional sedimentary systems	none	Wichitas/Blanco Basin
	F	4/17	Metamorphic processes	21	none

Week	Day	Date	Topic	Text	Lab
	M	4/20	Metamorphism facies	22	none
13	W	4/22	Metamorphic P-T space	23	Nonfoliated rocks
	F	4/24	Tectonic constraints	24-29	none
	W	4/27	Tectonic constraints	24-29	none
14	M	4/29	Metabasic and ultrabasic	24-29	Foliated rocks
	F	5/1	Metapelites	24-29	none
	M	5/4	Metacalcareous	24-29	none
15	W	5/6	Rock cycle	30	Lab final
	F	5/8	Project	none	none
F	**M**	**5/11**	**Final Exam Due**	**all**	**none**