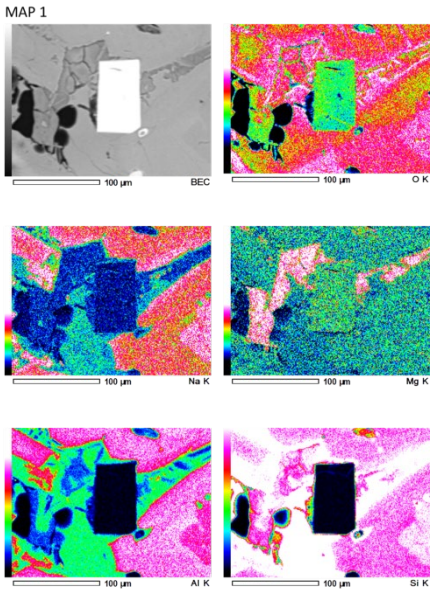
GEOLOGY 4403
IGNEOUS AND METAMORPHIC PETROLOGY

SPRING 2026

Dr. Urbanczyk, WSB 310 (-8110, kevinu@sulross.edu)

OFFICE: MWF 10-11; W 2-4; R 8:30-10:30



1 X-Ray map of a granodiorite xenolith

Purpose and Organization of Course: Igneous and metamorphic rocks comprise > 90% of the rocks of the Earth's crust. Knowledge of their nature and origin is, therefore, essential to understanding the geologic processes operating on our planet. The two main objectives of this course are: 1) to teach you how to identify the most common igneous and metamorphic rocks, both in the field and in the lab; and 2) to introduce you to the physical and chemical processes involved in their formation.

Learning Objectives: After completing this course, students will be expected to be able to identify common igneous rocks and minerals, have an understanding of the origins and evolutionary processes that create the diversity seen in igneous and metamorphic rocks on a global scale, and be able to independently analyze petrographic and geochemical data for a suite of rocks and interpret the history of these rocks.

Class meets in WSB310 MWF 12-12:50.

Labs: Lab meets on Monday–s, 2-5 in WSB 303. Lab will start with a review of optical mineralogy. The rest of the labs will involve examination of a suite of rocks in hand sample and thin section, and/or the analysis of geochemical data.

Problem sets: Homework assignments will be issued. Unless otherwise noted, these will be due exactly one week from the date assigned.

GRADING SCHEME	%
Exam 1	10
Exam 2	10
Final Exam	10
Homework and weekend Field Trip	15
Term paper	15
In-class quizzes	10
Lab	30
Total	100

In-class quizzes: In class quizzes will be issued periodically to encourage review of current material.

Field Trip(s): We plan/hope to have two field trips, one to the Davis Mountains state park, and a weekend trip to Big Bend Ranch State Park.

Semester projects: One term paper (and oral presentation) is required. This will cover a topic of your choice, approved by your instructor. The presentation will be made during the final week of class and attendance is mandatory for these. The term paper must have a minimum of 5 references from approved peer reviewed journals. The paper must be a minimum of 5 pages in length, double spaced, excluding graphics. A draft version of the paper will be due March 28. This will be graded and

the edits will be incorporated into the final version that will be due May 1. Grading will be 33% for draft, 67% for final.

Lecture Text: Gill, Igneous Rocks and Processes, **Lab Text: Philpotts,** Petrography of Igneous and Metamorphic Rocks, **Optional text: Nesse and Shulze** Introduction to Optical Mineralogy.

ADA Statement
SRSU Accessibility Services. Sul Ross State University (SRSU) is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the student's responsibility to initiate a request each semester for each class. Students seeking accessibility/accommodations services must contact Mrs. Mary Schwartze Grisham, LPC, SRSU's Accessibility Services Director or Ronnie Harris, LPC, Counselor, at 432-837-8203 or email mschwartze@sulross.edu or ronnie.harris@sulross.edu. Our office is located on the first floor of Ferguson Hall, room 112, and our mailing address is P.O. Box C122, Sul Ross State University, Alpine. Texas, 79832.

Student Responsibilities
All full-time and part-time students are responsible for familiarizing themselves with the Student Handbook and the Undergraduate & Graduate Catalog and for abiding by the University rules and regulations. Additionally, students are responsible for checking their Sul Ross email as an official form of communication from the university. Every student is expected to obey all federal, state and local laws and is expected to familiarize him/herself with the requirements of such laws.

Counseling
Sul Ross has partnered with TimelyCare where all SR students will have access to nine free counseling sessions. You can learn more about this 24/7/365 support by visiting Timelycare/SRSU. The SR Counseling and Accessibility Services office will continue to offer in-person counseling in Ferguson Hall room 112 (Alpine campus), and telehealth Zoom sessions for remote students and RGC students.

Libraries
The Bryan Wildenthal Memorial Library and Archives of the Big Bend in Alpine offer FREE resources and services to the entire SRSU community. Access and borrow books, articles, and more by visiting the library's website, library.sulross.edu/. Off-campus access requires logging in with your LobolD and password. Librarians are a tremendous resource for your coursework and can be reached in person, by email (srsulibrary@sulross.edu), or by phone (432-837-8123).
No matter where you are based, public libraries and many academic and special libraries welcome the general public into their spaces for study. SRSU TexShare Cardholders can access additional services and resources at various libraries across Texas. Learn more about the TexShare program by visiting library.sulross.edu/find-and-borrow/texshare/ or ask a librarian by emailing srsulibrary@sulross.edu.

Academic Integrity
Students in this class are expected to demonstrate scholarly behavior and academic honesty in the use of intellectual property. Students should submit work that is their own and avoid the temptation to engage in behaviors that violate academic integrity, such as turning in work as original that was used in whole or part for another course and/or professor; turning in another person's work as one's own; copying from professional works or internet sites without citation; collaborating on a course assignment, examination, or quiz when collaboration is forbidden. Students should also avoid using open AI sources *unless permission is expressly given* for an assignment or course. Violations of academic integrity can result in failing assignments, failing a class, and/or more serious university consequences. These behaviors also erode the value of college degrees and higher education overall.

Classroom Climate of Respect
Importantly, this class will foster free expression, critical investigation, and the open discussion of ideas. This means that all of us must help create and sustain an atmosphere of tolerance, civility, and respect for the viewpoints of others. Similarly, we must all learn how to probe, oppose and disagree without resorting to tactics of intimidation, harassment, or personal attack. No one is entitled to harass, belittle, or discriminate against another on the basis of race, religion, ethnicity, age, gender, national origin, or sexual preference. Still, we will not be silenced by the difficulty of fruitfully discussing politically sensitive issues.

Supportive Statement
I aim to create a learning environment for my students that supports various perspectives and experiences. I understand that the recent pandemic, economic disparity, and health concerns, or even unexpected life events may impact the conditions necessary for you to succeed. My commitment is to be there for you and help you meet the learning objectives of this course. I do this to demonstrate my commitment to you and to the mission of Sul Ross State University to create a supportive environment and care for the whole student as part of the Sul Ross Familia. If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you.

week	date	Topic		Lab
1	1/14/2026	Introduction		
	1/16/2026	Introduction		
2	1/19/2026	MLK - no class		L1 Optical Mineralogy review
	1/21/2026	Basalts and related rocks		
	1/23/2026	Basalts and related rocks		
3	1/26/2026	Basalts and related rocks		L2 Igneous minerals and textures
	1/28/2026	Magma Differentiation		
	1/30/2026	Magma Differentiation		
4	2/2/2026	Magma Differentiation		L3 M&M lab / magmatic differentiation
	2/4/2026	Magma Differentiation		
	2/6/2026	Gabbroic rocks		
5	2/9/2026	Gabbroic rocks		L4 Mafic igneous rocks
	2/11/2026	Gabbroic rocks	online	
	2/13/2026	Gabbroic rocks	online	
6	2/16/2026	Ultramafic and Ultrabasic rocks		L5 SEM/EDXRF and processing of geochemical data
	2/18/2026	Ultramafic and Ultrabasic rocks		
	2/20/2026	Ultramafic and Ultrabasic rocks Exam 1	online	
7	2/23/2026	Exam 1	online	L6 Quantitative Petrology – spreadsheets and modeling magma evolution
	2/25/2026	Andesite, dacite and rhyolite	online	
	2/27/2026	Andesite, dacite and rhyolite	BBRSP Field Trip	BBRSP field trip 2/27-3/1
8	3/2/2026	Andesite, dacite and rhyolite		**L7 Midterm**
	3/4/2026	Pyroclastic rocks		
	3/6/2026	Pyroclastic rocks		
SB		**Spring Break 3/9 to 3/13**		**Spring Break**
9	3/16/2026	Pyroclastic Rocks		L8 Intermediate and felsic rocks
	3/18/2026	Pyroclastic rocks		
	3/20/2026	Granitic rocks		
10	3/23/2026	**Granitic rocks; Draft Term Paper Due**		L9 Plutonic rocks
	3/25/2026	Granitic rocks		
	3/27/2026	Granitic rocks		
11	3/30/2026	Granitic rocks		L10 Pyroclastic rocks
	4/1/2026	Alkali rocks		
	4/3/2026	Alkali rocks		
12	4/6/2026	Alkali rocks		L11 DMSP field trip
	4/8/2026	Alkali rocks		
	4/10/2026	Exam 2		
13	4/13/2026	Metamorphic rocks		L12 Metamorphic rocks part 1
	4/15/2026	Metamorphic rocks		
	4/17/2026	Metamorphic rocks		
14	4/20/2026	Metamorphic rocks		L13 Metamorphic rocks part 2
	4/22/2026	Metamorphic rocks		
	4/24/2026	Metamorphic rocks		
16	4/27/2026	Presentations		**L14. Lab Final**
	4/29/2026	Presentations	**Last class**	
		Final Exam		**???**