

GEOLOGY 2405 MINERALOGY (CRYSTALLOGRAPHY AND OPTICAL MINERALOGY)

FALL 2022

Biology, Geology and Physical Sciences Department
Sul Ross State University

MWF 11:00-11:50 Lab Tue 2-5

Dr. E Measures

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432-837-8117; office WSB 315

Main office WSB 216; mail box drop

Main office phone 837-8112

Office hours:

Mon 2 pm to 4 pm

Tue Thrs 11 am to noon

Thrs Fri 3 pm to 5 pm

or by appointment; call or email to arrange
weekly schedule is posted on office door

Course Description

Introduction to crystallography, crystal chemistry, and optical mineralogy. Identification of minerals by physical, optical, and x-ray diffraction techniques. (as written in catalog)

Mineralogy is a fundamental class required for a degree in Geology. It provides a content foundation that is prerequisite for other, more advanced topics such as lithology, petrology, petrography and geochemistry.

This class will:

- 1) provide students with the skills needed to identify minerals in hand specimen, rock hand sample and thin section using simple physical tests, optical behavior, and other analytical techniques.
- 2) provide students with a background in the vocabulary and notation used in crystallography, optical mineralogy and geochemistry in order to understand technical literature.

Prerequisites/Co-requisites

GEOL 1303/1103 Physical Geology; CHEM 1311/1111 General Chemistry I

Method(s) of Instruction

The course consists of three hours of lecture (Measures) and three hours (minimum) of lab work per week.

One-day field trip(s) could be offered during the semester. At least one may be required.

Required Texts

Mineralogy text is on Reserve in the Library
any picture book of minerals in **thin section**

Reference Materials

Other books to be used for reference will be available in the lab.

Course Materials

notebook/paper	pencils	hand lens	small stapler
tracing paper	pasteboard (8½ by 11)	flat-headed tack	

Attendance Policy and Conduct Policy

Students are expected to be in lecture and lab every scheduled class day; arrive on time and stay for the duration of the class period.

Students are expected to be engaged, awake, on task, and to take notes and do what is need to understand the material.

For every hour spent in lecture, at least 2 to 3 hours should be spent outside class studying.

Lab will take a MINIMUM of 3 hours per week; the more hours spent on lab, the better the material will be understood.

Tardiness, leaving and returning during class/lab time, and not staying until the end of class/lab are not acceptable for other than legitimate reasons, which are determined by the instructor.

Legitimate reasons include rapid onset of events, or unexpected events, such as illness (hangovers

are not an illness), vehicle issues, family emergency, caregiver responsibilities, emergency responder calls, medical/dental appointments **with specialists**.
 Schedule appointments around class/lab time.
 Sleeping in class will not be tolerated; leave and go home, or to a vehicle, or to the nearest park bench to sleep.
 Texting in class will not be tolerated; students texting will leave for the remainder of the class period. Points will be deducted from the next exam.
 Laptop/notebook/notepad usage is to be limited to note-taking. Surfing the internet, playing games, checking email or working on a different class will not be tolerated; students will leave for the remainder of the class period. Points will be deducted from the next exam.

Electronics Policy

The only approved use of electronics is for taking notes or recording the class. Class recordings are not to be posted on any social media site.
 Electronics/cell phones/smart phones/ i-pods are to be turned OFF and put in book bags/purses. They are not to be held in laps or placed in a pocket of clothing or placed face down on top of the table or desk.
 To be exempted from this policy, the instructor must be provided with a written explanation and need for access to a phone, or text capable device.

Student Responsibility

Students are expected to get notes from another student IF class is missed.
 Students are expected to check Sul Ross email once a day.
 Students are expected to do any missed exams or labs within a week of the missed exam/lab. This requires coordinating with the instructor within one or two days of the missed exam/lab.

Disabilities Accommodation

ADA (Americans with Disabilities Act) 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 for accessibility services. Students seeking accessibility/accommodation services must contact Rebecca Greathouse-Wren, LPC-S, SRSU's Accessibility Services Coordinator at 432-837-8203 (leave a message and they will get back to you as soon as possible during working hours), or email rebecca.wren@sulross.edu. The office is located on the first floor of Ferguson Hall, Suite 112. The mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas, 79832.

You will be provided with an accommodation letter which must be given to the instructor as early as possible in the semester.

Grading/Course Requirements

Requirements:		Standard grading scheme:	
Exams (3)	57%	A	≥90%
Lab	30%	B	80-89%
Other	13%	C	70-79%
quizzes & hwork			(D and lower does not count for majors)
partic & behavior		D	60-69%
attend		F	≤59%
field trip(s)			

Exams - Cover the previous 4 to 4.5 weeks of material; vocabulary, symbology, notation and theory of Crystallography and Optical Mineralogy. Some material carries through so exams are comprehensive to an extent. Types of questions variable: true-false, matching, fill-in-the-blank, multiple choice, short answer, sketching, labeling, and discussion.

Field trip(s) - At least one trip offered toward end of the semester. Trip(s) probably day-long but may be overnight. Applies identification of minerals and minerals as seen in the field.

Homework - Questions over text and lecture material. Problem solving and practice problems in using and applying crystallography notation and symbology. Problem solving and practice in using and applying optical properties.

Quizzes - Short questions over class periods material. Notes may be used on some quizzes. Purpose is to evaluate comprehension and alert students to areas of weakness.

Lab - Hands-on study of minerals and their properties in hand samples, in rocks, and in thin sections.

The following schedule is approximate and subject to change:

Monday		Tuesday - LAB		Wednesday		Friday	
Aug 22	Intro	Aug 23	Review of Phys Geol Mineral Phys Props	Aug 24	Physical Properties of Minerals	Aug 26	Physical Properties of Minerals
Aug 29	Physical Properties of Minerals	Aug 30	hand samples 1 - Physical Prop	Aug 31	Chemistry	Sept 2	Chemistry; Crystal Systems; Sulf etc. mins
Sept 5	LABOR DAY Holiday no class	Sept 6	h samples 1 - ID hand samples 2 - Physical Prop	Sept 7	Crystal Systems; Crystallography	Sept 9	Symmetry; Ox, Hydrox, Hal etc mins
Sept 12	Miller Indices	Sept 13	h samples 2 - ID hand samples 3 - Physical Prop	Sept 14	Cardstock crystal forms	Sept 16	Xlography Sym; Silicate mins I
Sept 19	Notation and Symbology	Sept 20	h samples 3 - ID hand samples 4 - Phys Prop & ID	Sept 21	Stereonets	Sept 23	Silicate mins II Silicate mins III
Sept 26	EXAM 1	Sept 27	hand samples 5 Phys Prop & ID	Sept 28	Light	Sept 30	Light & Relief
Oct 3	Relief & Refractive Index	Oct 4	Lab Practical 1 Hand samples	Oct 5	Refractive Index	Oct 7	Optical Properties
Oct 10	Optical Properties	Oct 11	Scope Intro Thin Sections 1	Oct 12	Optical Properties	Oct 14	Isotropic & Anisotropic Behavior
Oct 17	Anisotropic Behavior	Oct 18	Thin Sections 2	Oct 19	Anisotropic Behavior	Oct 21	Uniaxial Indicatrix
Oct 24	Uniaxial Minerals	Oct 25	Thin Sections 3	Oct 26	Interference Figures	Oct 28	EXAM 2
Oct 31	Biaxial Indicatrix	Nov 1	Thin Sections 4	Nov 2	Biaxial Minerals	Nov 4	Interference Figures
Nov 7	Atomic Structure	Nov 8	Thin Sections 5	Nov 9	Atomic Structure	Nov 11	VETERANS DAY no class
Nov 14	Pauling's Rules	Nov 15	Thin Sections 6	Nov 16	Pauling's Rules	Nov 18	Lattices & Unit Cells
Nov 21	Lattices & Unit Cells & Phase Diagrams	Nov 22	Thin Sections 7	Nov 23	Thanksgiving Holiday No Class	Nov 25	Thanksgiving Holiday No Class
Nov 28	Phase Diagrams	Nov 29	Lab Practical 2	Nov 30	Phase Diagrams		
		DEC 6	EXAM 3 10:15 to 12:15				

BS Geology Student Learning Outcomes (SLO's):

1. The student will be able to apply a diverse body of Geologic information in the area of Earth history.
2. The student will be able to apply a diverse body of Geologic information in the area of mineralogy and petrology.
3. The student will be able to apply a diverse body of Geologic information in the area of structural geology and tectonics.
4. The student will be able to apply a diverse body of Geologic information in the area of stratigraphy.
5. The student will be able to apply a diverse body of Geologic information in the area of field techniques.

Expected Course Learning Objectives:

At the end of the semester, the successful student will be able to:

- * identify rock-forming minerals, accessory minerals and ore minerals both in hand sample and in thin section; SLO # 2 ... to apply a diverse body of Geologic information in the area of mineralogy and petrology; SLO # 5 ... to apply a diverse body of Geologic information in the area of field techniques.
- * identify, interpret and explain the optical behavior of a mineral; SLO # 2 ... to apply a diverse body of Geologic information in the area of mineralogy and petrology.
- * demonstrate application of physical and optical properties to minerals in rock samples and thin section; SLO # 2 ... to apply a diverse body of Geologic information in the area of mineralogy and petrology; SLO # 5 ... to apply a diverse body of Geologic information in the area of field techniques.
- * interpret and apply common notation and symbology used in mineralogy; SLO # 2 ... to apply a diverse body of Geologic information in the area of mineralogy and petrology.
- * integrate crystallography and mineralogy to explain physical and optical properties of minerals; SLO # 2 ... to apply a diverse body of Geologic information in the area of mineralogy and petrology.

Geology Undergraduate (BS) Student Marketable Skills:

1. The student will be able to conduct field work.
2. The student will be able to use field equipment.
3. The student will be able to use lab equipment.
4. The student will be able to use library resources.
5. The student will be able to communicate in written and oral format.

Library

The Bryan Wildenthal Memorial Library offers FREE resources and services to the entire community. The library's website, library.sulross.edu, has information on how to borrow or electronically access books, articles, and more. Off-campus access requires logging in with your LoboID and password. Librarians are a tremendous resource for coursework and can be reached by email (srsulibrary@sulross.edu) or phone (432-837-8123).

Academic Integrity

Students are expected to demonstrate scholarly behavior and academic honesty in the use of intellectual property. A scholar is expected to be punctual, prepared, and focused; meaningful and pertinent participation contributes to learning.

Examples of academic dishonesty include, but are not limited to:

- *Turning in work as original that was used in whole or in part for another course and/or professor;
- *Turning in another's person's work as one's own;
- *Copying from professional works or internet sites without citation;
- *Collaborating on a course assignment, exam, or quiz when collaboration is forbidden.

Classroom Climate Of Respect

This class should foster free expression, critical investigation, and open discussion of ideas. All people in the class must help create and sustain an atmosphere of tolerance, civility, and respect for the viewpoints of others. Similarly, all people in the class must 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. Discourse will not be silenced by the difficulty of fruitfully discussing politically sensitive issues.

Diversity Statement

This course should be a learning environment for students that supports diversity of thoughts, perspectives and experiences, and honors identities (including race, gender, class, sexuality, religion, ability, socioeconomic class, age, nationality, etc.). It is understood that COVID, economic disparity, and health concerns, or even unexpected life events could impact conditions necessary for students to succeed. The student will be given assistance to meet the course's learning objectives. This demonstrates commitment to the student and the mission of Sul Ross State University to create an inclusive environment and the whole student as part of the Sul Ross Familia. Class performance can be impacted by experiences outside of class and resources are available to the student for dealing with them.