

GEOLOGY 2405
MINERALOGY (CRYSTALLOGRAPHY AND OPTICAL MINERALOGY)

FALL 2020

Biology, Geology and Physical Sciences Department
 College of Arts and Sciences, Sul Ross State University
 MWF 11:00-11:50 Lab Tue 2-5

Dr. E Measures

Office in WSB 315
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Office hours:

call or email; or by appointment
 Mon 1:30 to 3:30 pm
 Tue 9 am to 10 am
 Thrs Fri 2 pm to 3 pm

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.

Blackboard will be used to some extent. Notification of material posted will be delivered through Sul Ross email.

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

Required Texts (see Blackboard for ISBN's)

Introduction to Mineralogy, 2012. Nesse, W.D. Oxford Univ Press.
 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

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.

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.

Conduct Policy

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.

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

Sul Ross State University is committed to equal access in compliance with the Americans With Disabilities Act of 1973. It is the policy of SRSU to provide reasonable accommodation to students with disabilities. If you would like to request such accommodation because of a physical, mental, or learning disability, please contact the Accessibility Services Co-ordinator (ADA co-ordinator), in Counseling and Accessibility Services, Ferguson Hall room 112, phone 432- 837-8203. It is the student's responsibility to initiate a request for accessibility services.

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:

Exams (3)	57%
Labs	30%
Other	13%
quizzes & hwok	
partic & behavior	
attend	
field trip(s)	

Standard grading scheme:

A	≥90%
B	80-89%
C	70-79%
D	60-69%
(D and lower does not count for majors)	
F	≤59%

Exams

Covers 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

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.

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.*

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.

The following schedule is approximate and subject to change:

Monday		Tuesday - LAB		Wednesday		Friday	
Aug 24	Intro	Aug 25	Minerals seen in Intro Geol labs	Aug 26	Physical Properties	Aug 28	Physical Properties
Aug 31	LABOR DAY Holiday no class	Sept 1	hand samples 1	Sept 2	Physical Properties & Chem Basics	Sept 4	Chemistry
Sept 7	Crystal Systems & Crystallography	Sept 8	hand samples 2	Sept 9	Crystallography	Sept 11	Symmetry
Sept 14	Miller Indices	Sept 15	hand samples 3	Sept 16	Cardstock crystal forms	Sept 18	Notation and Symbology
Sept 21	Notation and Symbology	Sept 22	hand samples 4	Sept 23	Stereonets	Sept 25	EXAM 1
Sept 28	Stereonets	Sept 29	Lab Practical 1	Sept 30	Light	Oct 2	Light & Relief
Oct 5	Relief & Refractive Index	Oct 6	Scope Intro	Oct 7	Refractive Index	Oct 9	Optical Properties
Oct 12	Optical Properties	Oct 13	Thin Sections 1	Oct 14	Optical Properties	Oct 16	Isotropic & Anisotropic Behavior
Oct 19	Anisotropic Behavior	Oct 20	Thin Sections 2	Oct 21	Anisotropic Behavior	Oct 23	Uniaxial Indicatrix
Oct 26	Uniaxial Minerals	Oct 27	Thin Sections 3	Oct 28	EXAM 2	Oct 30	Interference Figures
Nov 2	Biaxial Indicatrix	Nov 3	Thin Sections 4	Nov 4	Biaxial Minerals	Nov 6	Interference Figures
Nov 9	Atomic Structure & Pauling's Rules	Nov 10	Thin Sections 5	Nov 11	Atomic Structure & Pauling's Rules	Nov 13	Lattices & Unit Cells & Phase Diagrams
Nov 16	Lattices & Unit Cells & Phase Diagrams	Nov 17	Thin Sections 6	Nov 18	Lattices & Unit Cells & Phase Diagrams	Nov 20	Lattices & Unit Cells & Phase Diagrams
Nov 23	EXAM 3	Nov 24	Lab Practical 2	Nov 25	Thanksgiving Holiday No Class	Nov 27	Thanksgiving Holiday No Class
Nov 30	PRESENTATIONS	Dec 1	NO LAB	Dec 2	PRESENTATIONS		
		Dec 8	PRESENTATIONS 10:15 to 12:15				