GEOLOGY 2405
MINERALOGY (CRYSTALLOGRAPHY AND OPTICAL MINERALOGY)

FALL 2024

Geology Program, Natural Sciences Dept, ALPS College
Sul Ross State University

MonWedFri 9:00-9:50 Lab Tue 2-4:30

Dr. E Measures

office WSB 315
432-837-8117
measures@sulross.edu

Program office WSB 216
837-8112

Office hours:

Mon 2 pm to 5 pm
Thrs 2:30 pm to 5 pm

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

Course Description

Introduction to crystallography, crystal chemistry, and optical mineralogy. Identification of minerals by physical, optical, and x-ray diffraction techniques. Taken from SRSU Course 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 specimens and rock hand samples using simple physical tests, and identify minerals in thin section using optical behavior;
2) provide students with a background in the vocabulary and notation used in crystallography and mineralogy in order to understand technical literature.

Prerequisites/Co-requisites

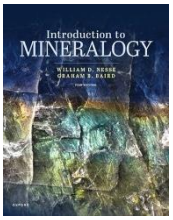
GEOL 1303/1103 Physical Geology; CHEM 1311/1111 General Chemistry I

Method(s) of Instruction

The course consists of three hours of classroom lecture and three hours of work during the scheduled lab time each week. Open lab hours will be offered.

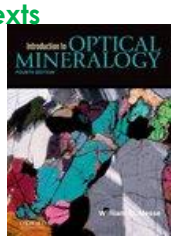
Required Text

Nesse & Baird
2023
Introduction to Mineralogy 4th ed.
9780197614600

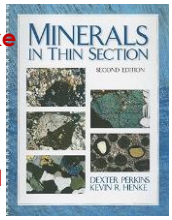


Recommended Texts

Nesse
2012 or 2013
Introduction to Optical Mineralogy 4th ed
9780199846276



Perkins & Henke
2003 or 2004
Minerals in Thin Section
Pearson Pub
9780131420151



Reference Books/Texts

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

Materials

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

Field Trip(s)

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

Student Responsibilities Statement

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 familiarize him/herself with the requirements of such laws.

Attendance Policy and Conduct- Expectations and Requirements

- Be on time to lecture and lab, attend all lectures and labs, and stay throughout the entire designated period.
- Be engaged, awake, and on task.
- Do not work on another class during this class.
- Multitasking during lecture is not a good idea.
- For every hour spent in lecture, at least 2 to 3 hours should be spent outside class studying.
- Where possible, schedule routine medical/dental appointments around lecture/lab times.
- Keep instructor informed either **before** anticipated absence or **soon after** unplanned absence.
- If you are going to miss a lecture, or have missed a lecture, written notification (email) and documentation must be provided as soon as possible. **Be sure to get the notes from another student in the class.**
- Legitimate reasons for tardiness, leaving and returning during class, or leaving class early are, but are not limited to, illness, appointment with specialist, family emergency, caregiver duties, and emergency responder calls.
- Inform instructor **prior** to class if conditions exist that may cause you to leave periodically during class or leave before the end of class.
- Arrangements for missed assignments and exams must be made, and the make-up done, within one week of the scheduled due date. Points will be deducted for late work on assignments other than exams.
- Late assignments will not be accepted once graded papers are returned.
- You are expected to check your SR email at least 3 times a day; morning, noon, and evening,
- You are expected to observe the University's Code of Student Conduct (see the Student Handbook).

Electronics Policy

- Texting, checking email, playing games, surfing the internet, working on another class during lectures is not acceptable.
- Smart phones, cell phones, i-pods, laptops, earbuds (etc.) are to be turned OFF during lectures.
- If taking notes on an electronic device is your preferred method, please discuss this with the instructor.
- If electronics are to be used for recording audio or for taking images of material written on the board, please discuss this with the instructor. DO NOT post any class recordings on any social media/web site.
- If you need access to your electronics during lectures (e.g., caregiver, emergency responder), for purposes other than note taking, audio recording, or obtaining images of material written on the board, discuss this with the instructor.
- Points will be deducted from exams for violation of the electronic policy during lectures.
- If electronics are accessed during an exam, then the exam will receive a grade of zero.
- If an electronic device makes an audible noise during an exam, then the exam will receive a grade of zero.
- Use of any AI on any assignment will result in a grade of zero on the assignment.
- Electronics may be used during lab and for purposes of lab.

Grading and Assignments

Requirements:

Exams (3)	57%
Lab	30%
Other	13%
quizzes & hwork	
partic & behavior	
attend & other	
field trip(s)	

Standard grading scheme:

A	≥90%
B	80-89%
C	70-79%

(D and lower does not count for majors)

D	60-69%
F	≤59%

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.

Lab - Hands-on study of minerals and their properties in hand samples, in rocks, and in thin sections. See lab syllabus for detailed description of grading assignments and criteria.

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.

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.

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.

The following schedule is approximate and subject to change:

Monday		Tuesday - LAB		Wednesday		Friday	
Aug 26	✦ Intro	Aug 27	✦ Phys Props of Minerals	Aug 28	✦ Physical Properties of Minerals	Aug 30	✦Physical Properties of Minerals
Sept 2	**LABOR DAY Holiday no class**	Sept 3	✦ Physl Props of Minerals	Sept 4	✦ Crystal Systems	Sept 6	✦ Crystal Systems
Sept 9	✦ Crystal Systems ✦ Symmetry	Sept 10	✦ hand sampls 1- Physical Prop	Sept 11	✦ Miller Indices	Sept 13	✦ Chem basics ✦ Min Chem Grps
Sept 16	✦ Oxides, Hydroxides	Sept 17	✦ hand sampls 2- Physical Prop ✦ h. samp 1 - ID	Sept 18	✦ Miller Indices ✦ Stereonets	Sept 20	✦Carbonates etc.
Sept 23	✦ Stereonets	Sept 24	✦ hand sampls 3- Phys Prop ✦ h. samp 2 - ID	Sept 25	✦ Stereonets	Sept 27	✦Silicate mins
Sept 30	**EXAM 1**	Oct 1	✦ hand samples 4-Phys Prop ✦ h. samp 3 - ID	Oct 2	✦Light	Oct 4	✦Light ✦Relief
Oct 7	✦Relief ✦Refractive Index	Oct 8	✦ hand samples 5-Phys Prop ✦ h. samp 4 - ID	Oct 9	✦Refractive Index	Oct 11	✦Optical Properties
Oct 14	✦Optical Properties	Oct 15	✦ h. samp 5 - ID ✦ Scope Intro	Oct 16	✦Optical Properties	Oct 18	✦Isotropic & An-isotropic Behavior
Oct 21	✦Anisotropic Behavior	**Oct 22**	**Lab Practical 1 Hand samples**	Oct 23	✦Anisotropic Behavior	Oct 25	✦Uniaxial Indicatrix
Oct 28	✦Uniaxial Minerals	Oct 29	✦ Thin Sections 1 & 2	Oct 30	✦Uniaxial Interference Figures	**Nov 1**	**EXAM 2**
Nov 4	✦Biaxial Indicatrix	Nov 5	✦ Thin Sections 3	Nov 6	✦Biaxial Minerals	Nov 8	✦Biaxial Interference Figures
Nov 11	✦Biaxial Interference Figures	Nov 12	✦ Thin Sections 4	Nov 13	✦Atomic Structure	Nov 15	✦Atomic Structure
Nov 18	✦Pauling's Rules	Nov 19	✦ Thin Sections 5	Nov 20	✦Pauling's Rules	Nov 22	✦Pauling's Rules
Nov 25	✦Lattices & Unit Cells	Nov 26	✦ Thin Sections 6	**Nov 27**	**Thanksgiving Holiday No Class**	**Nov 29**	**Thanksgiving Holiday No Class**
Dec 2	✦Lattices & Unit Cells & Phase Diagrams	**Dec 3**	**Lab Practical 2 Thin sections**	Dec 4	✦Phase Diagrams	Dec 6	No class
EXAM 3 TUESDAY DEC 10 8am to 10 am							

Disabilities Accommodation **ADA statement (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 Mrs. Mary Schwartze Grisham, LPC, SRSU's Accessibility Services Director at 432-837-8203 or email mschwartze@sulross.edu, **or contact Alejandra Valdez at 830-758-5006 or email alejandra.valdez@sulross.edu.** The office is located on the first floor of Ferguson Hall, room 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.

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 in the field and in the lab 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.

Geology Undergraduate (BS) Student Marketable Skills:

- The student will be able to conduct field work.
- The student will be able to use field equipment.
- The student will be able to use lab equipment.
- The student will be able to use library resources.
- The student will be able to communicate in written and oral format.

Library

The Bryan Wildenthal Memorial Library and Archives of the Big Bend offers FREE resources and services to the entire SRSU 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. Students should submit work that is their own. 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;
- Using AI for an assignment.

Violations of academic integrity can result in failing an assignment, failing the class, and/or more serious university consequences. These behaviors also erode the value of college degrees and higher education overall.

Classroom Climate of Respect

This class fosters free expression, critical investigation, and open discussion of ideas. Everyone 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.