

GEOLOGY 420 / 620 -- MINERALOGY 2007

DEPARTMENT OF GEOSCIENCES, NORTH DAKOTA STATE UNIVERSITY

COURSE INFORMATION AND TENTATIVE SCHEDULE

Time:	Tuesday and Thursday, 9:30 am — 11:20
Instructor:	B. Saini-Eidukat, office 129 Stevens Hall, ext. 1-8785 email: bse@geosci.ndsu.edu
Office hours:	Tuesday, 2:00 – 4:00 pm or by appointment
Text:	C. Klein and B. Dutrow, <i>Manual of Mineral Science</i> , 23rd Edition, John Wiley & Sons; [enrichment: T. Zoltai and J. Stout (Z&S), <i>Mineralogy: Concepts and Principles</i> (copies available in 134 Stevens)]
Web Site:	www.ndsu.edu/instruct/sainieid/min/

This course provides an introduction to mineralogy. The prerequisites are Chemistry 121 or 150. We will examine minerals from crystallographic, chemical, physical and thermodynamic points of view. We will learn how to identify and classify minerals, and how to measure their properties using morphology, X-ray diffraction, and optical microscopy. We will learn from a combination of lectures, in-class exercises and discussion, guest speakers, homework assignments, and term papers.

COURSE SCHEDULE:

Aug. 21	[T]	Introduction; Physical Properties of Minerals
Aug. 23	[R]	Symmetry Operations, Crystal Systems, Bravais Lattices

Crystallography and X-Ray Diffraction Methods in Mineralogy

Aug. 28	[T]	Crystal Morphology, Principal Directions, Point Groups
Aug. 30	[R]	Stereographic Projection, Cubic Point Groups
Sep. 4	[T]	Miller Indices; Crystal Forms
Sep. 6	[R]	Translational Symmetry; Plane Groups; Space Groups
Sep. 11	[T]	Symmetry in Crystal Structures; Crystal Growth and Defects; Twinning
Sep. 13	[R]	Exam 1
Sep. 18	[T]	Black Hills Field Course
Sep. 20	[R]	Black Hills Field Course
Sep. 25	[T]	Elements of X-Ray Diffraction
Sep. 27	[R]	X-Ray Diffraction

Crystal and Mineral Chemistry

Oct. 2	[T]	Bonding; Coordination
Oct. 4	[R]	Structure Types
Oct. 9	[T]	Chemical Compositions of Minerals, Analytical Techniques
Oct. 11	[R]	Compatibility Diagrams; Mineral Recalculation
Oct. 16	[T]	Graphical Representation; Substitution
Oct. 18	[R]	Exam 2

Systematic Mineralogy

Oct. 23	[T]	Non-silicates; Economic Mineralogy
Oct. 25	[R]	Intro to Silicate Mineralogy; Nesosilicates

Oct. 30	[T]	Sorosilicates, Cyclosilicates
Nov. 1	[R]	Inosilicates - single chain
Nov. 6	[T]	Inosilicates - double chain; asbestos
Nov. 8	[R]	Phyllosilicates
Nov. 13	[T]	Clay Mineralogy
Nov. 15	[R]	Exam 3
Nov. 20	[T]	Tectosilicates; Silica Minerals
Nov. 22	[R]	No Class - Thanksgiving Day Holiday
Nov. 27	[T]	Feldspathoids; Feldspars; literature report due
Nov. 29	[R]	Feldspars
Dec. 4	[T]	Zeolites
Dec. 6	[R]	Review

(Exam dates subject to change)

FINAL EXAM Monday, Dec. 10, 8:00 a.m. — 10:00 a.m.

Intended Student Outcomes:

- To be able to identify common rock forming minerals
- To understand the Earth processes that form minerals
- To understand chemical, physical, and crystallographic properties of minerals
- To understand mineral classification schemes
- To be familiar with analytical tools such as X-ray diffraction and electron microprobe analysis

Examinations and Grading:

Grading will be based on four exams (short answer, problem solving), several quizzes, a few homework assignments, a field trip, and a short literature report. Graduate students will be required to submit a 10-page paper based on a short independent research project.

Exams 1-3	50%
Final exam	20%
Quizzes & homework	20%
Literature report	10%

The final letter grade will be assigned based on the following table, unless the class average deviates significantly from 75%. In the latter case, a "curve" will be applied.

A = 90-100; B = 80-89; C = 70 - 79; D = 60-69; F = <60

"Borderline" cases will be judged individually, based on grade improvement, demonstrated effort, class participation, etc.

Special Needs: Students who need special accommodations for learning or who have special needs are invited to share these concerns or requests with the instructor as soon as possible.

Academic Responsibility: All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (www.ndsu.nodak.edu/policy/335.htm).