C-ID Descriptor
Mineralogy

Descriptor Details

- **Descriptor Title**: Mineralogy
- **C-ID Number**: 280
- **Units**: 4.0
- **Date of Last Revision**: 10/12/2017 04:43:50 PM PDT

General Description

Study of the crystalline structure, crystal chemistry, physical properties of minerals and their origin and classification. Lab activities will include crystallography, determination of physical properties and identification of silicate and non-silicate minerals.

Prerequisites

Physical Geology (C-ID GEOL 100) and General Chemistry – 1st semester (C-ID CHEM 110)

Corequisites

No information provided

Advisories

No information provided

Content

The Mineralogy course must address all of the major categories listed below and at least 80% of the subtopics.

1) Crystallography

- Symmetry
- Crystal Growth
- Stereographic Projections
- Internal Structure
- Crystal Form
- X-Ray Diffraction
- Miller Indices
- Twinning and Other Structural Defects

2) Physical Properties of Minerals

3) Mineral Chemistry

- Bonding
- Coordination of Atoms
- Silicate Structures
- Geochemical Calculations
- Phase Diagrams
- Polymorphism/Pseudomorphism/Polytypism
- Zoning
- Mineral Analysis and Graphical Representation

4) Classification of Minerals

5) Description of Common Mineral Groups

6) Occurrence and Use of Minerals

Lab Activities

1) Crystallography

- Determination of Symmetry
- Stereographic Projections
- Miller Indices
- X-Ray Diffraction

2) Physical Properties of Minerals

3) Identification of Silicate Minerals

4) Identification of Non-Silicate Minerals

5) Occurrence and Use of Minerals

6) Geochemical Calculations

7) Phase Diagram Exercises

8) Field Trips (optional)

Objectives

At the conclusion of this course, the student should be able to:

1. Classify crystals into the different crystal systems
2. Describe the relationship among chemistry, internal structure and external appearance
3. Determine the physical properties of physical minerals.
4. Identify physical samples of minerals, especially common ore minerals and rock forming minerals
5. Describe the occurrence and use of minerals, especially economic and silicate minerals
6. Communicate complex course concepts effectively in writing and diagrams

Evaluation Methods

Shall include multiple measures of performance that may include, but are not limited to:

- Quizzes
- Exams
- Written Assignments
- Research Assignments
- Laboratory Exercises and Reports
- Field Trip Reports

Textbooks

Introduction to Mineralogy (Oxford - Nesse)

Manual of Mineral Science (Wiley – Klein and Dutrow)

Mineralogy (Prentice Hall – Perkins)

Mineralogy and Optical Crystallography (MSA – Dyer, Gunter and Tasa)

Minerals: Their Constitution and Origin (Cambridge – Wenk and Bulakh)

Lab Manual:

Minerals and Rocks: Exercises in Crystal and Mineral Chemistry, Crystallogaphy, X-ray Powder Diffraction, Mineral and Rock Identification (Wiley – Klein)

Powder Diffraction, Mineral and Rock Identification (Wiley – Klein)