

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE  
SCHOOL OF ENGINEERING  
DEPARTMENT OF STRUCTURAL AND GEOTECHNICAL ENGINEERING  
ABET COURSE SYLLABI

**ICE2028 MINERALOGY AND PETROLOGY**

**Credits and contact hours:** 10 UC credits / 10 hours (3 h. Lectures and 7 h. Independent learning experiences)

**Instructor's name:** To be defined

**Course coordinator's name** Gloria Arancibia

**Textbook:**

- Blatt, H.; Tracy, R. (1996) Petrology: igneous, sedimentary and metamorphic. 2<sup>nd</sup> ed. W.H. Freeman and Company, New York.
- Nesse, W. (2012). Introduction to Mineralogy, 2<sup>nd</sup> ed. Oxford University Press.

**Course Catalog Description:** This course is planned to be taught on 2015. In it, students will learn the principles of crystal chemistry and crystallography of minerals. They will be able to distinguish and establish the origin of common minerals and learn the physical and chemical properties used on its identification. With this basic knowledge, students will be able to identify igneous, sedimentary and metamorphic rocks, including their textures and interpretation of the geological processes involved. They will also learn basic techniques of petrographic microscopy for the identification of minerals that form rock on thin sections, and igneous, sedimentary and metamorphic rock texture.

**Prerequisite Courses:** ICE2623 Introduction to physical geology or IMM2003 Mining Geology

**Co-requisite Courses:** None

**Status in the Curriculum:** Required

**Course Learning Outcomes:**

1. Relate the atomic structure of minerals with their morphology, chemistry and physical characteristics.
2. Identify and classify the most common minerals.
3. Apply the basic techniques on the study of minerals.
4. Recognize the genesis of minerals and mineralogical associations on different geological environments.
5. Understand the geological processes involved on the genesis of minerals and rocks.

**Relation of Course to ABET Criteria:**

- a. Knowledge of mathematics, science and engineering
- d. Multidisciplinary teams
- g. Effective communication
- h. Broad education necessary for global, economic, environmental and societal context
- i. Recognition of the need for, and an ability to engage in life-long

learning

j. Knowledge of contemporary issues

**Topics covered:**

1. Definitions and nomenclature.
2. Crystallography and Crystal chemistry
  - 2.1. Crystallization.
  - 2.2. Internal order.
  - 2.3. Morphology.
  - 2.4. Symmetry.
  - 2.5. Crystalline classes.
  - 2.6. Space groups.
  - 2.7. Crystalline structure.
  - 2.8. Mineral Chemistry.
  - 2.9. Mineral Stability.
3. Mineralogy
  - 3.1. Mineralogy of silicates.
  - 3.2. Mineralogy of native elements, sulfides and sulfosalts.
  - 3.3. Mineralogy of oxides, hydroxides and halides.
  - 3.4. Mineralogy of carbonates, nitrates, sulfates and others.
4. Genesis and associations of minerals:
  - 4.1. Environments of formation, macro and microscopic textures, chemical and mineralogical composition, formation processes of:
    - 4.1.1. Igneous rocks:
    - 4.1.2. Sedimentary rocks
    - 4.1.3. Metamorphic rocks.
    - 4.1.4. Hydrothermal and supergene alteration.