

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

**ICE2640      RESOURCES AND GEOLOGICAL EXPLORATION**

**Credits and contact hours:** 10 UC credits / 10 hours (3h Lecture; 3h Assistantship and 4h Independent learning experiences)

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

**Course coordinator's name** To be defined

**Textbook:**

- Evans, A. (1997) An introduction to economic geology and its environmental impact. Blackwell Science (ed), UK.
- Evans, A. (1996) Ore geology and industrial minerals: an introduction. 3rd ed. Blackwell Science, UK.

**Course Catalog Description:** This course is planned to be taught in 2016. It is an introduction to the nature and space distribution of geological resources with special emphasis in the Andes. Student will examine the metallic, nonmetallic, hydric and energetic deposits, and will receive the basic tools for their comprehension, exploration and geological evaluation.

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

**Co-requisite Courses:** None

**Status in the Curriculum:** Required

**Course Learning Outcomes:**

1. Understand basic geological and geophysical information of the different kind of geological resources.
2. Knowing and understanding the use of geological resources for a sustainable development.
3. Identifying the main types of geological resources based in their nature and space distribution in the context of the Andes geological history.
4. Understand the meaning of geological and metallogenic maps in different scales.
5. Identify and analyze the main mineral associations for the different types of representative geological deposits of the Andes.
6. Understand and elaborate geological sections of common deposits, correlating metal concentration with specific mineralization.

**Relation of Course to ABET Criteria:**

- a. Knowledge of mathematics, science and engineering
- b. Design and conduct experiments: analyze and interpret data
- d. Multidisciplinary teams
- f. Professional and ethical responsibility
- g. Effective communication
- h. Broad education necessary for global, economic, environmental and

societal context

j. Knowledge of contemporary issues

**Topics covered:**

1. Introduction.
  - 1.1. Geological resources: what are they and why are they useful?
  - 1.2. Tectonic frame of geological resources.
2. Nature and distribution of geological resources in the Andes.
  - 2.1. Geology of porphyry copper deposits.
  - 2.2. Geology of Iron Oxide Copper Gold (IOCG) deposits.
  - 2.3. Geology of epithermal deposits.
  - 2.4. Mineralogical associations.
  - 2.5. Geophysical exploration of metallic resources.
  - 2.6. Elaboration and interpretation of geophysical data of metallic deposits.
3. Nature and distribution of geological nonmetallic or industrial resources in the Andes.
  - 3.1. Rocks and industrial minerals.
  - 3.2. Saline deposits.
  - 3.3. Characteristics of nonmetallic minerals.
4. Geology of the hydric resource.
  - 4.1. Nature of aquifers.
  - 4.2. Geological and structural control over aquifers.
  - 4.3. Geophysical exploration of aquifers.
  - 4.4. Elaboration and interpretation of geophysical data for aquifers.
  - 4.5. Hydric resource in mining exploration.
5. Geology of the energetic resources.
  - 5.1. Hydrocarbons
  - 5.2. Geothermy
  - 5.3. Geophysical exploration of energetic resources.
6. Study of particular cases.
  - 6.1. Metallic deposits.
  - 6.2. Introduction to resource modeling: elaboration of sections and volume/tonnage estimation.
  - 6.3. Nonmetallic deposits.
  - 6.4. Aquifers.
  - 6.5. Energetic resources.