

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
COLLEGE OF ENGINEERING
DEPARTMENT OF MINING ENGINEERING
ABET COURSE SYLLABI

IMM1003 INTRODUCTION TO MINING

Credits and contact hours:	10 UC credits / 10 hours (3 h. Lectures and 7 h. Independent learning experiences)
Instructor's name:	Gustavo Lagos, Ronald Guzman, José Jara, Rodrigo Pascual
Course coordinator's name	Ronald Guzman
Textbook:	¿Minería para Siempre?, Gustavo Lagos, 2004.
Course Catalog Description:	Motivate new students of the Engineering School to think in their role in the Chilean and global mining with a clear vision of future and a defined mission in the country's development, by studying contingent problems through expositive and interactive lectures using basic tools of mathematics, physics and chemistry.
Prerequisite Courses:	Not required
Co-requisite Courses:	Not required
Status in the Curriculum:	Required
Course Learning Outcomes:	<ol style="list-style-type: none">1. Understand the basics of the engineering areas applied to mining, researching via Internet, reading technical articles and journals, and discussing with engineers and other professionals related to the area.2. Identify real engineering problems and opportunities across the whole mining value chain (exploration, exploitation and mineral processing).3. Analyze variables defining a system behavior and the impact on the feasible alternatives for implementation.4. Understand the physical and chemical basis associated to mineral processing through laboratory experiences.
Relation of Course to ABET Criteria:	<ol style="list-style-type: none">a. Knowledge of mathematics, science and engineeringb. Design and conduct experiments: analyze and interpret datac. Design a system, component, or processe. Identify, formulate, and solve engineering problemsj. Knowledge of contemporary issuesk. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Introduction to mining business and value chain
 - a. Geology and exploration
 - b. Exploitation and mineral processing
 - c. Equipment Assessment management
 - d. Mineral Economics
2. Geology and exploration
 - a. Rocks cycle
 - b. Structural and geotechnical rock properties
 - c. Mineralization and economic ore body
3. Mine Method selection and unit operations
 - a. Criteria to select mine methods (open pit / underground)
 - b. Fundamental to mine planning and design open pit mines
 - c. Unit Operations in open pit mines
 - d. Fundamental to mine planning and design underground mines
 - e. Open stope and caving methods
 - f. Unit operations in underground methods
 - g. Study case analysis (El Teniente, Collahuasi, others)
4. Mineral Processing
 - a. Basics concept applied to comminution and mineral recovery (copper study case)
 - b. Comminution process: Crushing & Grinding
 - c. SAG mill principles
 - d. Flotation rougher and cleaner process
 - e. Filtration and concentrate product
 - f. Tailing
5. Equipment Assessment and Maintenance
 - a. Concepts and models
 - b. Mining and Plant Equipment
 - c. Weibull distribution applied to maintenance equipment
 - d. Study case (shovel, Mill, crushing, other)
6. Mineral economics
 - a. Economics principles in the Mining Industry
 - b. Price econometric model
 - c. OPEX and CAPEX
 - d. Study case