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

IMM2003 MINING GEOLOGY

Credits and contact hours:	10 UC credits / 10 hours (3 h. Lectures and 7 h. Independent learning experiences)
Instructor's name:	Carlos Marquard
Course coordinator's name	José Joaquín Jara
Textbook:	Earth: An Introduction to Physical Geology by E.J. (Ninth Edition), Tarbuck, E. J. & Lutgens, F.K, 2008.
Course Catalog Description:	The course presents an introduction to Physical Geology basics (plate tectonics, geological time, rocks and minerals, seismicity, volcanism, surface processes and mineral, energy and water resources) in order to understand the relevance of geological processes in the sustainable development of human communities.
Prerequisite Courses:	QUIM100A General Chemistry II
Co-requisite Courses:	FIS1513 o ICE1513 Statics – Dinamics
Status in the Curriculum:	Required
Course Learning Outcomes:	Describe and understand the Earth, its origin and its changes over time, by learning a set of concepts, tools and geological techniques. Competencies: 1. Explain the overall functioning of the Earth system and its main internal and external processes. 2. Recognize and characterize materials and geological features. 3. Identify characteristic processes of different geological environments through relief, rock type, etc. 4. Apply scientific method in addressing geological problems. 5. Explain and prioritize relevance of fundamental geological processes in the formation and/or occurrence of mineral and water resources, geological hazards, environmental pollution, etc. 6. Identify, describe and explain materials and geological structures as manifested in nature. 7. Formulate hypotheses concerning materials and geological structures origin from field observations.

Relation of Course to ABET Criteria:

a. Knowledge of mathematics, science and engineering
b. Design and conduct experiments: analyze and interpret data
c. Design a system, component, or process
e. Identify, formulate, and solve engineering problems
j. Knowledge of contemporary issues
k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Introduction to Earth Science and Geology (weeks 1-2).
1.1. Presentation of the course. Origin of the Earth. Applications of Geology and Earth Sciences.
1.2. Theoretical Framework. Global Tectonics. Geological processes and products: Minerals, Rocks, Structures, Mountains chains.
1.3. Minerals. Silicates. Physical properties of minerals.
1.4. Geologic Time. Evolution of the Earth.
2. Rocks and Minerals (weeks 3-5).
2.1. Plutonism and Volcanism, Igneous rocks.
2.2. Plutonic and Volcanic Rocks (classification criteria).
2.3. Erosion, Transport and Deposition: Sedimentary Rocks.
2.4. Sedimentary Rocks (classification criteria).
2.5. Structural and Chemical transformation: Metamorphic Rocks and classification criteria.
2.6. Rock Cycle
3. Notions of Structural Geology (weeks 6-7).
3.1. Faults, joints and folds.
3.2. Fault systems in the Chilean Andes.
3.3. Crustal deformation (mountains and earthquakes).
3.4. Representation of lines and planes. Stereographic projection network.
4. Geotechnical Notions (week 9).
4.1. Rock Mass Classification.
5. Mineral and Energy Resources (weeks 8-10).
5.1. Metallic resources.
5.2. Non-metallic resources.
5.3. Water and energy resources.
5.4. Andean Deposits and Resources 1.
5.5. Andean Deposits and Resources 2.
6. Surface Processes (week 11).
6.1. Notions of Geomorphology.
6.2. Hydrogeology. Surface and Underground Water.
7. Notions of Environmental Geology (week 12).
7.1. Geologic Hazard and Risk, Aquifer Pollution.
7.2. Land use planning.
8. Geologic Maps (weeks 13 to 14).
8.1. Basics. Representation of geologic units. Geocoding data.
8.2. Geological profiles.
9. Andean range evolution (mountain formation and continent evolution) (week 15-16)

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