Ingeniería de Minas
FACULTAD DE CIENCIAS FÍSICAS Y MATEMÁTICAS UNIVERSIDAD DE CHILE

Diploma Applied

Geomechanics for Mining

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Director: Prof. Javier Vallejos

Presentation

The Department of Mining Engineering offers the **Diploma in Applied Geomechanics for mining.** The program is oriented to **engineers, geologists and others related engineering professionals.** This program provides students with a broad-based fundamental knowledge of geomechanics and mine design. It covers contents related to rock mechanics, underground mines, open pit mining, and numerical simulation.

It is also designed to **strengthen students' communication, problem-solving, critical thinking, and teamwork skills.**

Objectives

The main goal of the Diploma is to provide to our students with state-of-the-art tools, processes and methodologies in geomechanics. To achieve that goal, we have designed an academic program that incorporates techniques from other disciplines in order to improve the traditional approach. To meet this ambitious goal, we have selected a top-level faculty, academics of excellence with the trajectory and field experience necessary to meet the demands of these days.

Location: Department of Mining Engineering, Faculty of Physical and Mathematical Sciences - Universidad de Chile, Av. Tupper 2069, Santiago.
Time: Monday to Friday from 9:00 to 13:00 and from 14:00 to 18:00.

Contact: Ingrid Thiele - Verónica Möller
diploma@minas.uchile.cl
Phone number: (+562) 2978 4503

Note 1: *The Department of Mining Engineering has the right to suspend the Diploma if the number of students is not enough to ensure minimum administrative conditions and the quality of the program.*

Note 2: *If one of the lecturers or professors needs to be replace, the program has the commitment to find a new one with similar background.*

Course description

The Diploma considers 6 modules of one-week length (176 hours) covering different areas of Geomechanics applied to mining and personal work (84 hours) between modules. Here you can find a brief description or contents of the courses of the Diploma. Courses consider among their activities exercises with the supervision of assistants.

Students are required to have adequate English language skills so that they can study the complementary material.

1. Rock Mechanics

Stress tensor and deformation, introduction to in-situ stress, rock laboratory tests, behavior of intact rock, failure criteria and rock mass, rock mass rating, distribution of stress around excavations, methods for stress estimation, field visit: classification and structural mapping of rock mass, laboratory experience and data processing

2. Rock Excavation

Rock mass stabilization, convergence-confinement method, wedge stability analysis. Introduction to drilling and blasting, blasting fragmentation, controlled blasting and damage criteria, instrumentation and monitoring

3. Geomechanics for Massive and Selective Underground Mining

Geomechanical aspects of underground mining methods, design of basic mining units: stopes and pillars. Caving method design, open pit-underground interaction, subsidence.

4. Geomechanics for Open Pit Mining

Introduction to open pit mine design, failure mechanisms and slope instability, geotechnical design, criteria for acceptability and stability analysis, geotechnical risk. Hydrogeology on mine slopes, control alternatives for slope damage, monitoring methodologies.

5. Numerical Modelling in Geomechanics

Introduction to numerical modelling, types of numerical methods in rock mechanics, constitutive models and failure criteria, factor of safety and strength, acceptability. Analysis of stability of underground excavations by numerical techniques. Analysis of slope stability using numerical techniques.

6. Seminar: Project

Presentation and discussion of a project carried out by the student.

Each program's module will be evaluated through tests/readings/presentations/reports and/or a final exam. The minimum passing grade is 4,0 on a scale from 1,0 to 7,0.

Professors and Lecturers

- **Dr. Andrés Brzovic,** Geologist, Ph.D., Curtin University,
- **Prof. Javier Vallejos**, Civil Engineer, Ph.D., Queen`s University
- **Prof. Kimie Suzuki,** Ph.D. (c) Mining Engineering, The University of New South Wales, Australia
- **Sofía Rebolledo,** MSc in Geology - The University of Leeds, England
- **Ing. Alejandro Muñoz**, Ingeniero Civil, Universidad de Chile
- **Ing. Carlos Scherpenisse,** Ingeniero Civil Eléctrico, Universidad de Santiago
- **Dr. Guillermo Silva,** Ph.D. in Mining Engineering, Queen´s University, Canada
- **Ing. Manuel Rapiman**, Ingeniero Civil de Minas, Universidad de Chile
- **Ing. Lorena Burgos,** Magister en Minería, Universidad de Chile

Application and Admission Requirements

There are 15 positions and are offered in strict order of registration. Candidates fulfilling the following requirements, may apply to the Diploma:

- Hold a bachelor degree in a discipline related to the program. They may also apply those who hold a professional degree which level, content and duration of studies correspond to an equivalent to the degree of Bachelor of the University of Chile.
- Curriculum Vitae
- Application Form
- Sponsor letter (company's financing) and payment order

Each application will be resolved by the Academic Director of the Program, who will decide the acceptance of decline of the admission, based on the information presented.

Interested people registering the Diploma must apply to the program by sending the documents describe above to: **diploma@minas.uchile.cl**

Fees

CLP 5.800.000.- (US$ 9,000), per student

- All candidates must pay an enrollment fee of US$ 500 -CLP $ 350,000. This amount will be discounted from the total cost.
- Students that are sponsored by their companies must send a letter of support and a payment order.

Certification

After requirements are fulfil, the student will receive a **Diploma in Geomechanics Applied to Mining**, issued by the Faculty of Physical and Mathematical Sciences of the University of Chile.