NATIONAL UNIVERSITY OF ENGINEERING

COLLEGE OF GEOLOGICAL, MINING AND METALLURGICAL ENGINEERING

MINING ENGINEERING PROGRAM

MI514 – INTRODUCTION TO MINING

I. GENERAL INFORMATION

CODE	**:**	MI514 Introduction to Mining
SEMESTER	**:**	5
CREDITS	**:**	3
HOURS PER WEEK	**:**	5 (Theory–Practice)
PREREQUISITES	**:**	MA473 Differential Equations TM417 Topography
CONDITION	**:**	Compulsory
DEPARTMENT	**:**	Mining Engineering

II. COURSE DESCRIPTION

The course prepares students in the understanding of basic principles and method of mining operations including prospection, exploration, extraction, development and closing in both underground and surface mining. The course includes an introduction to metals and minerals processing, as well as the basic legal issues related to mining operations in Peru.

III. COURSE OUTCOMES

At the end of the course, students:

1. Identify and explain the main processes in open-pit mining, including preparation, accesses and mining exploitation.
2. Understand main process for extracting valuable minerals and metals considering their concentration levels.
3. Interpret the services in open-pit and underground mining including drilling and explosives and rock blasting.
4. Understand basic components of a mining plant, as well as typical operation in minerals and metals processing units.
5. Understand the importance of mining safety and environment care, as well issues related to interaction with local communities and government .

IV. LEARNING UNITS

1. GENERAL ISSUES

Legal framework and mining policy / Mining General Law / Mining investments and its financing / Distribution of the outcomes of mining activities /

2. MINING MATERIALS

Mining economic canon / Validity and royalty rights / Materials produced by mining / Metal minerals / Non-metal minerals / Industrial rocks / Great, middle and small mining.

3. FINAMINING METHODS

Legal definitions and techniques of prospecting and exploration / Use of topological and geological maps / Classification and selection of methods of underground exploitation based on deposit model, land quality and dilution / Mine design and development / Selection of access type: tunnels, ramps, vertical steps, slopes.

4. STABILITY AND REINFORCEMENT

Open pit stability / Stability of underground mines / Forces acting on excavations / Mining fortification / Scaling / Mining traditional methods / Mining modern methods / Concrete reinforced structures / Hydraulic filling / Paste filling / Mine clearing.

5. MINING COSTS

Mining efficiency / Mining investment / Mining costs / Short term costs / Fixed and variable costs / Mean cost / Marginal cost / Operating costs / Metal, mineral and concentrates commercial value / .

6. MINING VENTILATION AND SAFETY

Ventilation and air characteristics / Fresh air requirements / Natural and forced ventilation / Mining safety / Mining hygiene

V. PRACTICAL EXPERIENCES

1. Visit to a great mining plant.
2. Visit to a small mining plant

VI. METHODOLOGY

Active teaching is applied to promote lectures, student participation, workshops and team work. There are 5 practice sessions, which are focused on the development of learned topics. Technical visits allow to identify the different activities in underground and surface mining exploitation methods.

VII. GRADING FORMULA

The Final Grade PF is calculated as follow:

PF = (EP + EF + PP) / 3

EP: Mid-term Exam EF: Final Exam
PP: Average of 5 Practical Works

VIII. BIBLIOGRAPHY

1. **JUAN MENDOZA**
   Peruvian Geology
   Peruvian Institute of Geology, Mining and Metallurgy, INGEMET, 2015.

2. **LINDGREN**
   Mineral Deposits, 2015

3. **McINSTRY**
   Mining Geology, 2010