NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF GEOLOGICAL, MINING AND METALLURGICAL ENGINEERING
MINING ENGINEERING PROGRAM

GE801 – MINING GEOLOGY

I. GENERAL INFORMATION

CODE	**:**	GE-801 Mining Geology
SEMESTER	**:**	9-10
CREDITS	**:**	4
HOURS PER WEEK	**:**	6 (Theory–Practice–Laboratory)
PREREQUISITES	**:**	GE701 Mineral Deposits
CONDITION	**:**	Elective

II. COURSE DESCRIPTION

Geological maps and interpretations of photographs and satellite images of areas on mining exploration. Exploration methods and their interpretations. Guidelines on mineralization. Sampling in exploration and mining operation. Estimation of mineral resources and ore reserves.

III. COURSE OUTCOMES

1. Organize prior knowledge in various fields to use them profitably while performing classroom work.
2. Explain the Wilson cycle and its relation to the formation of mineral deposits.
3. Understands forming processes of mineral deposits and major metallogenic concepts.
4. Interpret the different data obtained in the various activities of exploration to define the best targets for exploration drilling.
5. Build models of the genesis of mineral deposits.
6. Recognizes the major exploration guides and their use in the exploration of mineral deposits.
7. Analyze the geological context of the mineralized occurrences and mining economic potential to establish whether or not it could become a successful mining project.

IV. LEARNING UNITS

1. PREPARATION OF PLANS IN THE EXPLORATION OF MINERAL DEPOSITS

Interpretation of geological maps / Sampling / Estimates of mineral resources and ore reserves / Exploration of deposits with drilling / Geochemical exploration of deposits.

2. GEOPHYSICAL EXPLORATION OF DEPOSITS

Laboratory work in deposit exploration / Interpretation of different data in exploration / Changes in geological interpretations during the exploration and exploitation of a deposit / Classification of exploration guides / Regional and local guides / Physiographic guides.

3. MINERALOGICAL GUIDES

Lithological guides / Stratigraphic guides / Fractures and faults as guides / Folding and contacts as guides / Faulting solution of mineralized structures / Persistence of the mine in depth.

V. LABORATORY AND PRACTICAL EXPERIENCES

1. Interpretation of geological maps in exploration / Examples of interpretation of aerial photographs in geological exploration / Example of calculation of reserves in veins and mantles / Example of calculation of resources and reserves in ore deposits / Practice of recording in drilling.
2. Interpretation of geochemical planes / Interpretation of geophysical planes / Interpreting microscopic studies in exploration / Examples of regional and local guides.
3. Examples of physiographic guides / Examples of mineralogical guides / Examples of lithological guides.

VI. METHODOLOGY

To achieve the objectives, the course will be developed using active methodology. In this perspective, the student is the main protagonist of the learning process and the instructor is the facilitator.

• Problem-based learning.

• Constant feedback during all activities.

The active participation of the student in individual and group in the problems solution.

VII. EVALUATION FORMULA

The Average Grade PF is calculated as follow:

PF = PP

PP: The average of practices is calculated after removing the lower grades.

VIII. BIBLIOGRAPHY

1. **MCKINSTRY**
   Mining Geology. Omega Edit., Barcelona, 1977.
2. **PETERS, W.C.**
   Exploration and Mining Geology. J. Whiley & Sons, 1987.
3. **EVANS, ANTHONY M.**
   Introduction to Mineral Exploration. 396 p., Blackwell, 1995.
4. **MOON, CHARLES J.; WHATELEY, M.K.; EVANS, ANTHONY M AND BARRET, WILLIAM L.**
   Introduction to Mineral Exploration. 481 p. Blackwell Science Ltd, 2006.

IX. COURSE CONTRIBUTIONS TO STUDENT OUTCOMES ATTAINMENT

Course contributions to Student Outcomes are shown in the following table:

Level 1: Know
Level 2: Comprehend, calculate
Level 3: Model, apply, solve
Level 4: Apply at advanced level, design. Achievement of Student Outcome

Outcome	Contribution
1. Engineering Design Design and integrate mining systems and components satisfying requirements and needs as well as given technical, economic, social and legal constraints and limitations.	3
2. Problem solving Identify, formulate and solve engineering problems properly using the methods, techniques and tools of mining engineering.	4
3. Sciences Application Apply the knowledge and skills of mathematics, sciences and engineering to solve mining engineering problems.	4
4. Experimentation and Testing Conceive and conduct experiments and tests, analyze data and interpret results.	4
5. Modern Engineering Practice Use and apply techniques, methods and tools of modern engineering necessary for the practice of mining engineering.	4
6. Engineering Impact Understand the impact of mining engineering solutions on people and society in local and global contexts.	4
7. Project Management Determine the budgets, schedules and feasibility of engineering projects, and participate in its management for the attainment of goals.	3
8. Environmental Appraisal Take into account the importance of preserving and improving the environment in the development of their personal and professional activities	4
9. Lifelong Learning Recognize the need to keep their knowledge and skills up-to-date according to advances of mining engineering and engage in lifelong learning.	3
10. Contemporary Issues Know and analyze relevant contemporary issues in local, national and global contexts.	4
11. Ethics and Professional Responsibility Evaluate their decisions and actions from a moral perspective and assume responsibility for the executed projects.	4
12. Communication Communicate clearly and effectively in oral, written and graphical formats, interacting with different types of audiences.	4
13. Teamworking Appraise the importance of teamworking and participate actively and effectively in multidisciplinary teams.	4