

## SUBJECT TEACHING GUIDE

M1638 - Exploitation Technology of mining resources

Master's Degree in mining engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Master's Degree in mining engineering			Type and Year	Compulsory. Year 1
Faculty	School of Mines and Energy Engineering				
Discipline	MINING				
Course unit title and code	M1638 - Exploitation Technology of mining resources				
Number of ECTS credits allocated	4,5	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. TRANSPORTES Y TECNOLOGIA DE PROYECTOS Y PROCESOS				
Name of lecturer	RUBEN PEREZ ALVAREZ				
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Other lecturers					

### 3.1 LEARNING OUTCOMES

- Once the course has been passed, students will dominate the most common techniques applied in the field of the exploitation of resources.

### 4. OBJECTIVES

The main aims of this subject are listed next: calculate and design the right support of a mining work, adjust the ventilation of a mining work to the specific needs of each operation, design and calculate the parameters required for the removal of water mine, located and designed in the most objective point of view from a technical and environmental heaps and raft fine necessary in a mining exploitation, Knowledge for the essential elements of the electrical system and its risks and know the techniques of extraction and more suitable movement of land.

## 6. COURSE ORGANIZATION

### CONTENTS

1	<p><b>TOPIC 1: SUPPORT IN MINING</b>  Support. Advantages and disadvantages of the use of steel versus wood. Description and functioning of rigid and articulated frames. Description and operation of the Sliding pictures. Definition of the phenomenon of convergence. Convergence galleries accompanying the pit. Bolts: Sustaining with bolts. Working concept of bolts. Anchor blocks, laminated land and subjected to shear displacements. System adhesively anchor. Friction anchoring system. Bolt type selection Bolting parameters. Curves load - deformation of individual bolts. Concrete projected. Advantages and disadvantages of the use of concrete. Mortars and concretes projected. Concrete components and dosages. Characteristic parameters concrete. Description gunning wet and dry methods.</p> <p><b>TOPIC 2: MINE VENTILATION</b>  Ventilation: Objectives ventilation. Atmosphere at the mine. Firedamp. Emanations of firedamp and dilution. The dust in the mine. Dilution of dust. A conduit resistance. Calculation equivalent resistance. Calculating ventilation networks. Characteristic curve of a mine.  Main Fans: Centrifugal and helical. Characteristic curves of the fans and coupling. Secondary ventilation blower suction and mixed. Secondary ventilation depending on the starting method.</p>
2	<p><b>TOPIC 3: MINE DRAINAGE</b>  Underground drain. The water in the mine. Centrifugal and drive. A power centrifugal pump. Pump characteristics curves. Determination of manometric height. Situation and organization of the pump room of a well. Selection of dewatering pumps. Underground drain. Drainage of mining operations. Calculation and flows avenues. Calculation of channels, ditches and settling ponds.</p> <p><b>TOPIC 4: HEAP</b>  Generating heaps and residues tailings. Construction of heap. Stability analysis of heaps. Environmental impact of the heaps. Selection the site of a heap. General design criteria for raft ponds: transport and disposal. The dam and the stability of the dam. The water in the dam.</p>
3	<p><b>TOPIC 5: ELECTRICITY</b>  The electricity in the mine. Risks of electricity in mining. Preventive and protective measures. Ways and degrees of protection. Electrical installation: main elements, technical instructions of application, ATEX regulations, calculation an underground electrical grid.</p> <p><b>TOPIC 6: TILLAGE</b>  Tillage of mineral and energy resources. Techniques applied in the extraction of rocks industrial and ornamental. Earthworks. Joints. Planning, dimensioning, performance and efficiency machining extraction techniques and not machining extraction techniques. Mining through drilling. Leach mining. Geothermal.</p>

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Final exam	Written exam	Yes	Yes	60,00
Individual work	Work	No	Yes	20,00
Group work	Work	No	Yes	10,00
Resolution of practical exercises	Others	No	Yes	10,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>In order to pass, the student will be required to obtain a minimum score of 4,5/10 in the Final Exam of Contents, and an average score of 5/10 in the whole subject. If the minimum requirement of the final exam is not fulfilled, the final score will be calculated according to the weighted average of the different criteria, until a maximum of 4.9. Any passed item of the continuous evaluation will be kept for the extraordinary exam.</p> <p>The final exam will be held on-site. However, if Health and Educational Authorities suspended in-class activities, it will be developed through Moodle, and monitored with Teams.</p>				
<b>Observations for part-time students</b>				
<p>Part-time students will be evaluated according to the Normative of University of Cantabria. Part-time students will be evaluated following the Normative of University of Cantabria. In addition to the requirement of passing the Final Exam of Contents, and given the characteristics of the activities proposed for the continuous evaluation, part time students will be subject to them as the rest of students.</p>				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

Manual de Ventilación de Minas. Vicente Luque Cabal. AITEMIN  
 El agua en la minería y obras subterráneas. Consejo Superior de Ingenieros de Minas.  
 Fundamentos de Laboreo de Minas. Fernando Pla Ortíz. Fundación Gómez Pardo.  
 Curso de Laboreo de Minas. L. Cuadra. Fundación Gómez Pardo.  
 Manual de Evaluación y Diseño de Explotaciones MIneras. M. Bustillo Revuelta y Carlos López Jimeno.  
 Apuntes básicos de la asignatura. Proporcionados por el profesor.