

SUBJECT TEACHING GUIDE

M1639 - Modelling and evaluation of geological resources

Master's Degree in mining engineering

Academic year 2020-2021

1. IDENTIFYING DATA					
Degree	Master's Degree in mining engineering			Type and Year	Compulsory. Year 1
Faculty					
Discipline	MINING				
Course unit title and code	M1639 - Modelling and evaluation of geological 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. CIENCIAS DE LA TIERRA Y FISICA DE LA MATERIA CONDENSADA				
Name of lecturer	ALBERTO GONZALEZ DIEZ				
E-mail	alberto.gonzalez@unican.es				
Office	Facultad de Ciencias. Planta: + 2. DESPACHO PROFESORES (2006)				
Other lecturers	GEMA FERNANDEZ MAROTO				

3.1 LEARNING OUTCOMES

- Acquisition of the skills to understand, analyze, study and modeling of mineral resources for sustainable use and proper management.

4. OBJECTIVES

Students will acquire knowledge of different types of mineral resources ; thus they will be able to model these, using specific softwares, that allows reaching to determine evaluation criteria and management, and even sustainable exploitation criterias.

6. COURSE ORGANIZATION

CONTENTS

1	<p>PART I: GEOLOGICAL RESOURCES</p> <p>Unit 1. Introduction. Types of geological resources: metallic and nonmetallic minerals, energy minerals and rocks. General characteristics. Their relationships with the theory of plate tectonics.</p> <p>Unit 2. Metallic ore deposits. Classification and genetic models. Deposits of non-metallic minerals. Classification and genesis. The industrial rocks. Genesis and classification.</p> <p>Unit 3: Energy deposits: Coal and hydrocarbons. Genesis and genetic models. Uranium deposits.</p>
2	<p>PART II: ASSESSMENT AND MODELING OF GEOLOGICAL RESOURCES</p> <p>Unit 4. Introduction. Obtaining data for the evaluation of geological resources. Methods of mining research. Boreholes and types. Sounding recognition and sampling. Geophysical and geochemical methods.</p> <p>Unit 5. Mapping applied to mining research. Remote sensing techniques. Automatic cartography and software. Geological data collected in the field. Predictive models of deposits.</p> <p>Unit 6. Concept of mineral reserve and types of ore reserves. Methods for evaluating geological resources: mining volume calculations: geometric methods; profile methods; polygons methods; geostatistical methods.</p> <p>Unit 7. Modelling of geological resources. Application of software for modelling and evaluation of geological resources. Predictive models Calculation of mineral reserves.</p> <p>Unit 8. Modeling of hydrocarbon deposits. Paleontological, sedimentological, stratigraphic, geophysical and geochemical techniques. Methods of exploitation.</p>
3	<p>PART III: GEOLOGICAL RESOURCE MANAGEMENT</p> <p>Unit 9. Management of geological resources. Classification of geological resources according to the Law of Mines. Pre-feasibility and Feasibility studies. Investments in the start-up of a geological resource: inland operations and open-pit operations. Profitability of a mining operation.</p>

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
This exercise modality is divided in two sections which include a first part with the presentation of a report of the lab practices (contributing 10% of the final assessment) ; and a second part dedicated to the presentation and defence of a report about	Work	No	Yes	40,00
Final examination Part A, belonging to the first part of the contents presented (contributing 30% of the final assessment), including a test type questionnaires, and questions about relationships of the theoretical contents presented.	Written exam	Yes	Yes	30,00
Final examination Part B, belonging to the second part of the contents presented (contributing the rest 30% of the final assessment), including a test type questionnaires, and questions about relationships of the theoretical contents presented.	Written exam	Yes	Yes	30,00
TOTAL				100,00
Observations				
The delivery of the practice report is necessary to proceed to the final evaluation. In case of confinement by the COVID-19 the examination exercise will be carried out with using a virtual support through the platforms enabled by the Centre for this purpose.				
Observations for part-time students				
Part-time students will be evaluated according to the same criteria as other students. Nonetheless they will have a special attention in order to lead them to make evaluación tests simultaneously to the rest taking into account their availability.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
ORCHE GARCÍA, E. (2001). MANUAL DE GEOLOGÍA Y PROSPECCIÓN DE YACIMIENTOS MINERALES. ED. CARLOS LÓPEZ JIMENO. MADRID
BUSTILLO REVUELTA, M. (1996). RECURSOS MINERALES: TIPOLOGÍA, PROSPECCIÓN, EVALUACIÓN, EXPLOTACIÓN, MINERALURGIA, IMPACTO AMBIENTAL. ED.MANUEL BUSTILLO, CARLOS LÓPEZ
VAZQUEZ GUZMÁN, F. (2012). MANUAL DE YACIMIENTOS MINERALES. UD.PROYECTOS.MADRID.
EDWARDS, R. (1986). ORE DEPOSIT GEOLOGY AND ITS INFLUENCE ON MINERAL EXPLORATION. ED. CHAPMAN AND HAL. LONDON
MANUAL DE ROCAS ORNAMENTALES:PROSPECCIÓN, EXPLOTACION Y COLOCACIÓN/Editor López Jimeno, CArlos. Madrid. LOEMCO,D.L. 1996
MANUAL DE ÁRIDOS: PROSPECCIÓN, EXPLOTACIÓN Y APLICACIONES/ EDITOR CARLOS LÓPEZ JIMENO: ETS DE INGENIEROS DE MINAS, 1998.
CRAIG, J.R. VAUGHAN, D.J. & SKINNER, B.J. (2006). RECURSOS DE LA TIERRA: ORIGEN, USO E IMPACTO AMBIENTAL. ED. PEARSON.
BUSTILLO, M. RUIZ SÁNCHEZ-PORRO, J, LOPEZ JIMENO, C, GARCÍA, P (2000). MANUAL DE APLICACIONES INFORMÁTICAS EN MINERÍA. UD.PROYECTOS. MADRID.

