



1. General information

Course: MINING RESEARCH**Type:** CORE COURSE**Degree:** 384 - MINING AND ENERGY ENGINEERING DEGREE**Center:** 106 - SCHOOL OF MINING AND INDUSTRIAL ENGINEERING**Year:** 3**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 19519**ECTS credits:** 6**Academic year:** 2022-23**Group(s):** 51**Duration:** First semester**Second language:****English Friendly:** Y**Bilingual:** N

Lecturer: SATURNINO LORENZO ALVAREZ - Group(s): 51				
Building/Office	Department	Phone number	Email	Office hours
Edificio STORR, Planta Primera, Despacho 1.02	INGENIERÍA GEOLÓGICA Y MINERA	926264007 Ext 6017	saturnino.lorenzo@uclm.es	To be announced at the beginning of the academic year
Lecturer: LUIS MANSILLA PLAZA - Group(s): 51				
Building/Office	Department	Phone number	Email	Office hours
Laboratorio de Ciencias de la Tierra. Primera planta edificio Störr	INGENIERÍA GEOLÓGICA Y MINERA	6002	luis.mansilla@uclm.es	To be announced at the beginning of the academic year
Lecturer: JESUS SANCHEZ VIZCAINO - Group(s): 51				
Building/Office	Department	Phone number	Email	Office hours
EDIFICIO POLITECNICO	INGENIERÍA GEOLÓGICA Y MINERA	3289	jesus.svizcaino@uclm.es	To be announced at the beginning of the academic year

2. Pre-Requisites

It is a subject with no established requirements, but it would be advisable for the student to have passed the subjects related to geology, mineralogy, etc.

3. Justification in the curriculum, relation to other subjects and to the profession

This is a catch-all subject for the follow-up of other subjects, as it is the basis for the application of other disciplines of a mining geology nature in the degree programme.

4. Degree competences achieved in this course

Course competences

Code	Description
A11	To understand the multiple legal and technical restrictions which are to be considered in the Mining Engineering field and which are intended, according to what it was established in part 5 of the ministerial order CIN/306/2009 of 09-02-2009, the prospection and mining-geological research, all kind of geological exploitations including ground water, underground works, underground storage, treatment and processing plants, energy plants, metallurgical as well as iron and steel plants, building material plants, carbon and chemical, petrochemical, gas, waste treatment plants and effluents, explosive factories, and capacity to use verified methods and recognized technologies with the aim of getting the highest efficacy having environmental concern and protecting the health and security of workers and users of those facilities.
C17	Capacity to know, understand and apply the principles of the mining research in different mining resources and techniques of shallow and deep exploration.
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CT00	To promote respect and promotion of Human Rights as well as global access principles and design for everybody according to the 10th final order of the Law 51/2003 of December 2nd, about equal opportunities, non-discrimination and universal accessibility for people with disabilities.
CT02	To be acquainted with Information and Communication Technology ICT
CT03	Capacity for written and oral communication skills.
CT04	Capacity to accept ethical and deontological professional responsibility.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

To know how to design and organize prospection and mining research campaigns
To acquire the skills to handle equipment and software tools to develop mining research methodologies
To know the main geological prospection suitable methods for basic mining prospection campaigns
To be able to use bibliography and documentation to write reports and practical assignments
To be able to express yourself using a minimum vocabulary to communicate in the professional world of mining research
To know and understand the basic principles which shape prospection methods as tools for mining research
To understand the relationship between scientific and technological progress in the mining field

6. Units / Contents

Unit 1: Didactic unit 1 Approach to mining research

- Unit 1.1 Introduction
- Unit 1.2 Geological methods of prospecting I
- Unit 1.3 Geological methods of prospecting II
- Unit 1.4 Mining research soundings
- Unit 1.5 Practical I (C) Visit to companies in the sector
- Unit 1.6 Economics in mining research
- Unit 1.7 Practical 2 (G) Planning and carrying out a mining research project

Unit 2: Didactic unit 2. Geophysical Prospecting Techniques

- Unit 2.1 The geophysics
- Unit 2.2 Gravimetric method
- Unit 2.3 Practice 3 (G) Exercises on gravimetric application
- Unit 2.4 Geo-electrical methods
- Unit 2.5 Practice 4 (G) Exercises on the application of electrical methods.
- Unit 2.6 Practical 5 and 6 (G) Field application work.
- Unit 2.7 Seismic methods
- Unit 2.8 Practice 7 (G) Application exercises in seismics
- Unit 2.9 Geophysical logging
- Unit 2.10 Practical 8 (G) Application exercises in geophysical logging.
- Unit 2.11 Other methods geophysical
- Unit 2.12 Seminar on the latest applications and technological innovations in geophysics

Unit 3: Didactic unit 3. Geochemical Prospecting Techniques.

- Unit 3.1 General introduction to geochemistry.
- Unit 3.2 Basic concepts in geochemical prospecting.
- Unit 3.3 Analytical methods and techniques
- Unit 3.4 Other geochemical methods
- Unit 3.5 Practical 9 (G and C) Application exercises in geochemical prospecting.

ADDITIONAL COMMENTS, REMARKS

Given the applied nature of the course, both the programme of practical exercises and their evaluation are included in the syllabus.
In them, there will be a combination of practical work (G), visits to companies, as well as field trips (C). There will also be a seminar with the aim of bringing the students closer to the latest developments and applications of geophysics in the different fields of use of this discipline.

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	A11 C17 CB01 CB02 CB03 CB04 CB05 CT00 CT02 CT03 CT04	1.3	32.5	N	-	
Class Attendance (practical) [ON-SITE]	Combination of methods	A11 C17 CB01 CB02 CB03 CB04 CB05 CT00 CT02 CT03 CT04	0.28	7	Y	Y	
Field work [ON-SITE]	Practical or hands-on activities	A11 C17 CB01 CB02 CB03 CB04 CB05 CT00 CT02 CT03 CT04	0.28	7	Y	Y	
Workshops or seminars [ON-SITE]	Lectures	A11 C17 CB01 CB02 CB03 CB04 CB05 CT00 CT02 CT03 CT04	0.1	2.5	N	-	
Study and Exam Preparation [OFF-SITE]	Self-study	A11 C17 CB01 CB02 CB03 CB04 CB05 CT00 CT02 CT03 CT04	3.6	90	N	-	
Individual tutoring sessions [ON-SITE]	Guided or supervised work	A11 C17 CB01 CB02 CB03 CB04 CB05 CT00 CT02 CT03 CT04	0.2	5	N	-	
Final test [ON-SITE]	Assessment tests	A11 C17 CB01 CB02 CB03 CB04 CB05 CT00 CT02 CT03 CT04	0.24	6	Y	Y	

Total credits of in-class work: 2.4	6	150	Total class time hours: 60
Total credits of out of class work: 3.6			Total hours of out of class work: 90

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System			
Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Progress Tests	60.00%	60.00%	Final exam eminently practical and applied concepts.
Fieldwork assessment	15.00%	15.00%	Participation in the execution of field work
Theoretical papers assessment	25.00%	25.00%	Completion of a report with all the exercises of the class practicals
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

The continuous assessment of the subject will take into account the value obtained in the final test (this test will consist of a series of exercises whose subject matter will try to cover most of the aspects of the subject, establishing the evaluation scales in each question), the assignments and practicals elaborated throughout the course

Non-continuous evaluation:

The non-continuous assessment of the subject will take into account both the value obtained in the final exam (this exam will consist of a series of exercises whose

The extraordinary evaluation will take into account both the value obtained in the final exam (this exam will consist of a series of exercises whose subject matter will try to cover most of the aspects of the subject and which will include an exercise related to fieldwork, establishing the evaluation scales for each question) and the submission of the practical report.

Specifications for the resit/retake exam:

The extraordinary evaluation of the course will consider both the value obtained in the final test (this test will consist of a series of exercises whose subject matter will try to cover most of the aspects of the subject where an exercise related to fieldwork will be incorporated, establishing the evaluation scales in each question), plus the work and practices elaborated throughout the course that will appear in a report.

Specifications for the second resit / retake exam:

In the special final examination, the weight of the evaluation will fall on the final test and the delivery of the practical report.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	6
Unit 1 (de 3): Didactic unit 1 Approach to mining research	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	10
Class Attendance (practical) [PRESENCIAL][Combination of methods]	1
Field work [PRESENCIAL][Practical or hands-on activities]	1
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	2
Unit 2 (de 3): Didactic unit 2. Geophysical Prospecting Techniques	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	18
Class Attendance (practical) [PRESENCIAL][Combination of methods]	4
Field work [PRESENCIAL][Practical or hands-on activities]	3
Workshops or seminars [PRESENCIAL][Lectures]	2.5
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	2
Unit 3 (de 3): Didactic unit 3. Geochemical Prospecting Techniques.	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4.5
Class Attendance (practical) [PRESENCIAL][Combination of methods]	2
Field work [PRESENCIAL][Practical or hands-on activities]	3
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	1
Global activity	
Activities	hours
Class Attendance (practical) [PRESENCIAL][Combination of methods]	7
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	6
Field work [PRESENCIAL][Practical or hands-on activities]	7
Workshops or seminars [PRESENCIAL][Lectures]	2.5
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	5
Class Attendance (theory) [PRESENCIAL][Lectures]	32.5
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Schlumberger Cia.	Interpretación de Perfiles. Fundamentos y Aplicaciones 1990				1990	
Telford et al.	Geofísica Aplicada	Cambridge University Press			2004	
Rose Arthur, W.	Geochemistry in mineral exploration	Academic Press			1990	
Orellana E.	Prospección Geoelectrica en corriente alterna	Omega			1982	
Kreiter, V.M.	Investigación y Prospección Geológica	Paraninfo	Madrid		1979	
Parasnis, D.S.	Principios de Geofísica Aplicada	Chapman and Hall.			1997	
Rose Arthur, W.	Modern analytical geochemistry an introduction to quantitat	Longman		0-582-09944-7	1997	
Cantos Figuerola, J.	Tratado de Geofísica Aplicada				1975	
Orche, E.	Manual de Geología e Investigación de Yacimientos Minerales	U:D: Proyectos de la ETSIM de Madrid			2001	
Dominique Chapelier	Diagrafías Aplicadas a la Hidrogeología	Lavoisier			1987	
Astier, J.L.	Geofísica Aplicada a la Hidrogeología	Paraninfo			1982	
Evans, A.	Introduction to mineral exploration	Blackwell Science			1995	
	Treatise on geochemistry	Elsevier/Pergamon		0-08-043751-6	2004	
Orellana E.	Prospección Geoelectrica en corriente continua	Omega			1982	