Universidad Zaragoza

Academic Year/course: 2022/23

26423 - Mineral and Energy Resources

Syllabus Information

Academic Year: 2022/23
Subject: 26423 - Mineral and Energy Resources
Faculty / School: 100 - Facultad de Ciencias
Degree: 296 - Degree in Geology
588 - Degree in Geology
ECTS: 7.0
Year: 3
Semester: Second semester
Subject Type: Compulsory
Module:

1. General information

1.1. Aims of the course

he 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth ? all while tackling climate change and working to preserve our oceans and forests. In this context, the achievement of the learnnig objectives is related with the next SDGs:

SDG 4: Quality Education

SDG 7: Affordable and Clean Energy

SDG 9: Industry, Innovation and Infrastructure

SDG 11: Sustainable Cities and Communities

SDG 12: Responsible Consumption and Production

SDG 13: Climate Action

1.3. Recommendations to take this course

This course covers the processes that control the formation of ore deposits, energy and geothermal resources. Resource forming processes are examined in the framework of the tectonic, petrogenetic and geochemical evolution of the Earth's crust on local, regional and global geological scales. Thus, the course draws upon igneous, metamorphic and sedimentary processes, mineralogy, geochemistry and structural geology. To sum op, the course is designed to allow students to recognize exploration and targeting model for mineral and energy resources.

2. Learning goals

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

Assessment details

Exam (65%)

A continuous assessment at the end of both sections will be take. To get the section is mandatory a minimun of 6.0. A final exam is set at the end of the course in case of some of the sections had not been overcome.

Practicals (35%)

Practicals will cover aspects of hand sample mineral and rock identification, drill core logging and appraisal of alteration styles associated with mineralisation. Worksheets are required to be handed in at the end of each practical, and/or combined with short take home assignments.

Field work (1 point)

The practical course will also involve a field practical to a several mine sites in some Spanish mining district.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, seminars, fieldwork, autonomous work and study and assessment tasks.

More and more geologists are expressing opinions about our mineral and energy supplies and doing so we incur an obligation to understand the factors that control their genesis. That is what this course is about. Consequently, students are expected to demonstrate a thorough understanding of the theory, principles and practice of various fields of Geology. This is the reason why, lectures will be complemented with practice sessions and a 4-days field trip. Students should be able to work independently and in teams in fieldwork and to demonstrate basic research, creative problem-solving and critical thinking skills. At this level they should show well developed communication skills and be able to structure logical arguments in both verbal and written forms in seminars and reports. Knowledge and skills will be assessed by means of written exams, assignments and field reports.

The University places a high priority on approaches to learning and teaching that enhance the student experience. Feedback is sought from students in a variety of ways including ongoing engagement with staff, and the use of online discussion boards. Presentations as well as lecture notes will be available in the online learning platform (https://moodle.unizar.es/add/).

4.2. Learning tasks

This course is organized as follows:

- **Lectures** (2,8 ECTS: 28 hours)
- **Practice sessions** (2.2 ECTS: 22 hours)
- **Fieldwork** (2.0 ECTS: 16 hours) 4-day trips
- **Autonomous work and study** (100 hours)

Teaching and assessment activities will be carried out on site for as long and as much as possible. This scenario could change if safety regulations related to the covid19 crisis recommended online activities.

4.3. Syllabus

This course will address the following topics:

Lectures

Section 1. General Concepts of Mineral and Energy Resources

- Topic 1. Basic concepts
- Topic 2. Morphology, structures and textures of mineral deposits. Minerography
- Topic 3. Hydrothermal alteration: Types and exploration
- Topic 4. Fluids and Hydrothermal Systems
- Topic 5. Plate Tectonic and rock and ore-forming processes

Section II. Types and Use of Mineral and Energy Resources

- Topic 6. Introduction: Mining operations and their environmental impacts
- Topic 7. Energy Resources: Fossil fuels. Geothermal power and Nuclear energy. Uranium deposits
- Topic 8. Metal Resources: Abundant metals and main ore deposits
- Topic 9. Metal Resources: Scarce metals and major ore deposits
- Topic 10. Gemstones and main deposits
- Topic 11. Fertilizer and Chemical Industrial Minerals
- Topic 12. Building materials

Practice sessions

- Topic 1. Mines Law problems
- Topic 2. Drill logging
- Topic 3. Mesoscopic and microscopic recognition of ore minerals and textures in polished sections: ore dressing

Fieldwork

- This course includes 4-day field trip to one of the major mining district of Spain.

4.4. Course planning and calendar

This is a second semester course. Classes will start on the first academic week.

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences and Earth Sciences Department websites (https://ciencias.unizar.es, https://cienciastierra.unizar.es) and Moodle.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=26423