Universidad Zaragoza

Academic Year/course: 2023/24

26441 - Applied Sedimentology and Coal & Petroleum Geology

Syllabus Information

Academic year: 2023/24
Subject: 26441 - Applied Sedimentology and Coal & Petroleum Geology
Faculty / School: 100 - Facultad de Ciencias
Degree: 296 - Degree in Geology
588 - Degree in Geology
ECTS: 5.0
Year: 4
Semester: First semester
Subject type: Optional
Module:

1. General information

Subject focused on understanding the geological processes that condition the development of geological resources associated with sedimentary environments, especially of organic origin.

Objectives:

1. To know the main natural resources, especially of organic origin, associated with sedimentary environments
2. To know the features of sedimentary environments with organic matter production, as well as the processes involved in their genesis.
3. To apply stratigraphic and sedimentological knowledge to characterize and evaluate sedimentary deposits
4. To know the interest of the physical properties of sedimentary particles and bodies for their application in applied geology.
5. To understand the formation environment of deposits associated with deposits of organic origin.

These approaches and objectives are aligned with the following SDGs of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), so that the acquisition of the learning results provides training and competence to contribute to some extent to their achievement." 7, 9, 11 and 13. They also contribute to the achievement of Goals 4 and 5.

2. Learning results

In order to pass this subject, the students shall demonstrate they has acquired the following results:

- Knows and understands the processes that generate natural resources of sedimentary origin, especially those rich in organic matter.
- Understands the relationship of coal layers and the original sedimentary environment and is able to interpret their origin.
- Knows the main geological parameters that condition the development of a coal deposit and its potential interest
- Knows the main uses and methods of exploitation of rocks of organic origin as well as the problems they present and the processes that minimize their harmful effects on the environment.
- Knows the main characteristics of gas and oil reservoirs and the geological processes involved in their formation, migration and accumulation.
- Is able to apply working methods (especially geological maps, correlation and interpretation of sequences and simple structural data) useful in the exploration and exploitation phase of a deposit and to plan research campaigns.
- Knows the possibilities of exploration of natural resources associated with sedimentary environments and the main features of these environments.
- Knows the physical properties of sedimentary bodies and sedimentary particles with a view to their interest in the field of Applied Geology.
- Is able to analyse and synthesize information on topics related to the genesis of sedimentary resources and to present and defend in public works related to this topic.
- Is able to locate scientific articles in Spanish and English and select the most relevant information they contain

3. Syllabus

Theory:

- Production, accumulation and conservation of organic matter. Control factors. Kerogen.
- Sedimentary environments producing organic matter.
- Peat bogs: Factors controlling its development and types.
- Coal components. Macerals. Lithotypes and micro lithotypes.
- Maturation of organic matter.
- Coal extraction methods and uses. Coal and the Environment.
- Oil and natural gas. Properties, composition, origin and evolution.
- Source rock and oil migration. Warehouse rock. Rock seals and traps.
- Interest in the knowledge of petroleum geology.

Practices focused on:

- Research, evaluation and prospecting of natural resources associated with sedimentary environments.
- Interest of macerals.
- Evaluation of hydrocarbon reservoir potential.

Field trips focused on:

Deposits of organic origin: Training, operation and restoration. Depleted reservoirs.

4. Academic activities

Teaching activities during the development of the subject :

Activity 1: Acquisition of basic knowledge of the subject. Theoretical classes (15h)

Activity 2: Practical exercises to apply the contents covered in theory classes. Two-hour sessions (25 h). In connection with this activity students must submit:

- Report of two practices related to the exploitation of sedimentary resources and the relationship of macerals to paleoenvironmental conditions.
- Bibliographic report, in pairs, on an oil basin.

Activity 3: Identification of geological aspects in three field days. In connection with this activity the students will answer a short questionnaire at the end of each field trip.

Activity 4: Theoretical-practical exam.

5. Assessment system

Continuous assessment

- **Practical work**, as described in section 4:
    - Individual report of two practices of those worked on in the laboratory (30%)
    - Bibliographic work (in pairs) on an oil basin to be accompanied by an oral presentation

  (30% of the grade)
- **Questionnaires** after the field trips (10%)

Theoretical-practical exam (30%)

A grade of 5 or more in at least three of the evaluation activities is required to pass the subject and a grade of at least 4 in the fourth is necessary to average.

The final evaluation will take into account the degree of participation in the classes.

For students who have not opted for continuous assessment, the grade will be obtained in the global test that will include :

- Theoretical-practical exam (which in the case of these students will account for 70%)
- Submission of a paper related to organic resources (30%)