

26413 - Sedimentary Petrology

Syllabus Information

Academic Year: 2019/20

Subject: 26413 - Sedimentary Petrology

Faculty / School: 100 -

Degree: 296 - Degree in Geology

588 - Degree in Geology

ECTS: 6.0

Year: 588 - Degree in Geology: 2

296 - Degree in Geology: 2

Semester: Second semester

Subject Type: Compulsory

Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

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. It is prepared in such a way that it will provide the students with the necessary link between the theoretical knowledge and its practical use in the Sedimentary Petrology field. A wide range of teaching and learning tasks are implemented, such as lectures, laboratory sessions, problem-solving sessions and fieldwork. The student will be able to recognise, describe and classify sedimentary rocks, identifying their main compositional, textural and structural characters in outcrop, hand samples and thin sections.

4.2.Learning tasks

This course is organized as follows:

- **Lectures** (2.2 ECTS: 22 hours). Two 55-minute sessions per week in which theoretical foundations of the course will be explained.
- **Practice sessions** (3.8 ECTS: 30 hours). One 2.5-hour weekly session of laboratory or problem-solving (optical microscopy). In these sessions various laboratory and fieldwork techniques and optical microscopy will be applied

in order to analyse sedimentary rock compositions, textures, fabrics and the effects of diagenetic processes.

- **Fieldwork.** Two daylong field trips are scheduled in this course.
- **Autonomous work and study** (74 hours).
- **Assessment tasks** (8 hours)

4.3.Syllabus

This course will address the following topics:

Lectures

Section I. Fundamentals

- **Topic 1.** Introduction. The Petrogenetic cycle. Classification of sedimentary rocks.
- **Topic 2.** Chemical and mineralogical composition of the sedimentary rocks.
- **Topic 3.** Textural components of siliciclastic and carbonate rocks. Classification.
- **Topic 4.** Textural components of chemical rocks.
- **Topic 5.** Structures in sedimentary rocks.

Section II. Diagenesis

- **Topic 6.** Diagenesis. Major diagenetic processes. Diagenetic stages and realms. Diagenetic grade indicators. Diagenetic textures and structures.
- **Topic 7.** Diagenesis of siliciclastic rocks. Sandstones: shallow and burial diagenetic environments and processes. Mudrocks: diagenesis of clay minerals. Conglomerates and breccias: effects of compaction. Porosity and permeability.
- **Topic 8.** Diagenesis of carbonate rocks. Cementation processes: mineralogy, texture and diagenetic environment. Dissolution processes and secondary porosity. Biogenic degradation processes. Neomorphism. Physical and chemical compaction. Dolomitisation: dolomitisation mechanisms and models. Dolomitisation and porosity. Dedolomitisation processes.
- **Topic 9.** Diagenesis of evaporite rocks. Gypsum and anhydrite rocks. Halite rocks.
- **Topic 10.** Siliceous (chert) and iron-rich sedimentary rocks. Origin. Mineralogical and textural characters. Diagenesis.

Practice sessions

Section I. Laboratory

- Session 1. Sample preparation (weighing out, cutting, polishing, coding, etc.). Colour determination. Hardness and composition.
- Session 2. Structures and discontinuities. Textural analysis with acetate peels.
- Session 3. Mineral identification in hand specimens. Hardness, etching with acids, and staining. Observation with binocular lens.
- Session 4. Porosity determination by hydrostatic weighing.
- Session 5. Size measurements and granulometry. Phase separation.
- Session 6. Petrophysical characters. Measurement of sound propagation.
- Session 7. Photographic techniques. Drafting a report.

Section II. Optical microscopy.

- Session 1. Basic mineralogy in sedimentary rocks. Review of optical properties.
- Session 2. Siliciclastic rocks: clasts, matrix and cements.
- Sessions 3 and 4. Siliciclastic rocks: percentage estimation of textural components. Classification.
- Session 5. Carbonate rocks. Allochems: skeletal and non-skeletal grains.
- Session 6. Carbonate rocks. Orthochems: matrix and cements. Porosity types.
- Session 7. Carbonate rocks. Diagenetic processes.
- Session 8. Carbonate rocks. Classification.

Section III. Fieldwork

- Field trip 1. Precambrian-Cambrian rocks outcropping near Calatayud village (Zaragoza).
- Field trip 2. Carbonate-evaporitic rocks of the Tertiary Calatayud Basin (Zaragoza).

4.4.Course planning and calendar

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://cienciatierra.unizar.es>) and Moodle.

4.5. Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=26413&year=2019