

## 26434 - Clay Geology

### Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	296 - Degree in Geology
ECTS	5.0
Course	4
Period	First semester
Subject Type	Optional
Module	---

### 1. Basic info

#### 1.1. Recommendations to take this course

#### 1.2. Activities and key dates for the course

### 2. Initiation

#### 2.1. Learning outcomes that define the subject

#### 2.2. Introduction

### 3. Context and competences

#### 3.1. Goals

#### 3.2. Context and meaning of the subject in the degree

#### 3.3. Competences

#### 3.4. Importance of learning outcomes

### 4. Evaluation

### 5. Activities and resources

#### 5.1. General methodological presentation

The process of learning will be based on the development of the following methodologies:

- Activity 1. Learning of concepts related to the properties, structure, composition and formation of clays (2.8 ECTS).  
Methodology: Theory class (28 h.)

- Activity 2. Laboratory class (1 ECTS, 10h). Use of X-ray diffraction and scanning electron microscopy to characterize clays. The students should write a report that will contain a summary in English (0.2 ECTS)

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- Activity 3. Field trip: 1-day field trip to study a deposit rich in industrial clays (0.4 ECTS).

- Activity 4. Seminars related to applications of clays (0.8ECTS). The students will have to do a searching and summary of information and give an oral.

During the year, bibliography and websites in English will be used. These activities correspond to 0.5 ECTS in English for the students.

### **5.2.Learning activities**

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Activity 1. Learning of concepts related to the properties, structure, composition and formation of clays. Methodology: Participatory theory class (28 h.)

Activity 2. Practical classes. Use of X-ray diffraction and scanning electron microscopy to characterize clays. Methodology: Laboratory classes (1ECTS).

Activity 3. Identify and describe clay mineral associations in their geological context.

Methodology: 1-day field trip to study a deposit rich in industrial clays (0.4 ECTS)

Activity 4. Searching and summary of information related to clays. Methodology: Seminars (0.8 ECTS)

### **5.3.Program**

Activity 1. Learning of concepts related to the properties, structure, composition and formation of clays. Methodology: Participatory theory class (28 h.)

Program:

T1. Introduction. Definition of clay. Importance of the clay minerals.

T2. Mineralogy, composition and properties of the clay minerals.

T3. Appropriate methods to study clays.

T4. Origin of clays by rock Weathering and soil formation

T5. Erosion, Sedimentation and Sedimentary Origin of Clays

T6. Genesis of clays during diagenesis, very-low grade metamorphism and hydrothermal alteration.

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T7. Industrial Clays. Applications of clay minerals.

### 5.4.Planning and scheduling

Rooms and timetable for the theoretical classes will be shown in the website of the Faculty of Sciences.

Practical sessions will be place in the Crystallography and Mineralogy labs (Earth Sciences Department) and in the Electron Microscopy Service (Campus Rio Ebro, University of Zaragoza).

Days for the field trip and the Electron Microscopy activity will be scheduled by the Commission of the Degree in Geology.

Oral presentations will be during the moths of April and May and days will be agreed with the students.

### 5.5.Bibliography and recomended resources

<b>BB</b>	Chamley H.. Clay sedimentology. Springer-Verlag. 1989
<b>BB</b>	Environmental interactions of clays / A. Parker, J.E. Rae (Eds.) Berlin [etc.] : Springer, 1998
<b>BB</b>	Low-grade metamorphism / [edited by] Martin Frey, Doug Robinson Oxford [etc.] : Blackwell Science, 1999
<b>BB</b>	Origin and mineralogy of clays : clays and the environment / B. Velde (ed.) Berlin ; London : Springer-Verlag, cop. 1995
<b>BB</b>	Velde, Bruce. Introduction to clay minerals : chemistry, origins, uses and environmental significace / B. Velde . - [1st ed.] London [etc.] : Chapman & Hall, 1992