250308 - MINERAL - Mineralogy

Coordination unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2018
Degree: BACHELOR'S DEGREE IN GEOLOGICAL ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 9

Teaching language: Catalan

Degree competencies to which the subject contributes

Specific:
4035. Mineralogical, petrographic and geotechnical tests. Sample techniques.
4036. Students will learn to select the most appropriate sampling and implementation techniques for mineralogical, petrographic and geotechnical surveys.

Transversal:
591. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.
597. EFFECTIVE USE OF INFORMATION RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.
601. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

Teaching methodology

The course consists of 3 hours per week of classroom activity (large size group).

The 3 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

Support material in the form of a detailed teaching plan is provided using the virtual campus of the Universitat de Barcelona (http://campusvirtual.ub.edu/): content, program of learning and assessment activities conducted and literature.

Learning objectives of the subject

Students will acquire a general understanding of mineralogy and learn to apply this knowledge to specific scientific and technical problems and to geological engineering in general.
Upon completion of the course, students will be able to:  

1. Use skills including the capacity for spatial vision to solve crystallographic problems, and describe the structure and external form of crystals;  
2. Identify minerals with the naked eye and using transmitted and reflected light microscopy;  
3. Relate the crystallographic and geochemical features of minerals to their stability, genesis, formation and durability.

Common minerals in geology; Ground behaviour and its implications in engineering, focusing particularly on the deduction of physical properties from the structure and chemical composition of solids; Atomic structure, crystallographic computation, symmetry, x-ray diffraction, anisotropy, isomorphism and polymorphism; Mineralogical analysis techniques; Basic structural and chemical characteristics of minerals (silicates, native elements, sulphides, halides, sulphates, carbonates, phosphates, etc.), their behaviour during internal and external cycles, and their durability under meteoric conditions; Identification of the principal minerals in geology and civil engineering; Identification with the naked eye and transmitted and reflected light microscopy

| Study load |
|-----------------|-----------------|---------------------|
| **Total learning time:** 225h | Hours large group: 39h | 17.33% |
| | Hours medium group: 30h | 13.33% |
| | Hours small group: 21h | 9.33% |
| | Guided activities: 9h | 4.00% |
| | Self study: 126h | 56.00% |
## Content

<table>
<thead>
<tr>
<th>Crystallography</th>
<th>Learning time: 76h 48m</th>
</tr>
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<tbody>
<tr>
<td>Description:</td>
<td>Theory classes: 12h</td>
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<tr>
<td></td>
<td>Practical classes: 6h</td>
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<td></td>
<td>Laboratory classes: 14h</td>
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<td></td>
<td>Self study : 44h 48m</td>
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<tr>
<td>Specific objectives:</td>
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<tr>
<td>Crystal properties crystalline solid</td>
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<td>Symmetry</td>
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<tr>
<td>Crystalline Structures</td>
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<tr>
<td>Exercises of crystallography</td>
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<table>
<thead>
<tr>
<th>General Mineralogy</th>
<th>Learning time: 45h 36m</th>
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<tbody>
<tr>
<td>Description:</td>
<td>Theory classes: 3h</td>
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<td></td>
<td>Laboratory classes: 16h</td>
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<td></td>
<td>Self study : 26h 36m</td>
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<td>Specific objectives:</td>
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<tr>
<td>This session will also highlight the main techniques of chemical and physical</td>
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<td>characterization of materials that can identify minerals and their known</td>
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<td>chemical composition and degree of alteration.</td>
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<td>The main objective of this theme is to acquire the ability to choose what</td>
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<td>technique should be used to study a particular problem in front of mineralogical</td>
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<tr>
<td>question (the chemical composition of one mineral, to identify a mineral, to</td>
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<td>characterized their color, etc...)</td>
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</table>
### Other minerals of economic interest

**Learning time:** 64h 48m  
- **Theory classes:** 5h  
- **Laboratory classes:** 22h  
- **Self study:** 37h 48m

**Description:**  

**Specific objectives:**  
Understand the main ore minerals of this class, its uses, stability and genesis.

### Rock forming minerals

**Learning time:** 108h  
- **Theory classes:** 13h  
- **Laboratory classes:** 32h  
- **Self study:** 63h

**Description:**  
Carbonates: Crystallochemistry, crystallography, structures and classification. Calcite Group, the dolomite Group, the Aragonite Group. Stability and metaestability, genesis. Uses, cement aluminous cement and portland, diseases and durability.  

**Specific objectives:**
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Qualification system

Avaluació continuada al llarg del curs, a partir de la realització d'exercicis en línia, tests i problemes. (20% de la nota).

Teoria:
Examen parcial eliminatori de matèria de la part de Cristal·lografia, i examen final de mineralogia.

Pràctiques:
Examen parcial eliminatori de matèria de identificació a visu, i examen final d'identificació mineral mitjançant el microscopi de llum transmesa.

Per poder-se examinar de reconeixement de minerals al microscopi de llum transmesa serà imprescindible haver superat una prova prèvia de reconeixement de quars - plagiòclasi - feldspat potàssic en una roca plutònica àcida.

Les notes de teoria i pràctiques només es promitjaràn en el cas de ser notes iguals o superiors a 4.

Avaluació única

Teoria: Examen final de Cristal·lografia i de Mineralogia (dues convocatòries).
Pràctiques: Examen final (dues convocatòries) en el qual s'haurà de demostrar la capacitació de reconeixement mineral a visu, i al microscopi de llum transmesa.

Mitjançant el fòrum dels dossiers electrònics es mantindrà un debat sobre diferents casos teòrics, en el qual el professorat actuarà com a moderador del debat. A més es realitzaran exercicis en línia al campus virtual.

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Les notes de teoria i pràctiques només es promitjaràn en el cas de ser notes iguals o superiors a 4.

Es obligatori haver realitzat tota la part d'avaluació continuada per poder aprovar.

Criteria for re-evaluation qualification and eligibility: Students that failed the ordinary evaluation and have regularly attended all evaluation tests will have the opportunity of carrying out a re-evaluation test during the period specified in the academic calendar. Students who have already passed the test or were qualified as non-attending will not be admitted to the re-evaluation test. The maximum mark for the re-evaluation exam will be five over ten (5.0). The non-attendance of a student to the re-evaluation test, in the date specified will not grant access to further re-evaluation tests. Students unable to attend any of the continuous assessment tests due to certifiable force majeure will be ensured extraordinary evaluation periods.

These tests must be authorized by the corresponding Head of Studies, at the request of the professor responsible for the course, and will be carried out within the corresponding academic period.

Regulations for carrying out activities

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.
Bibliography

Basic:


Complementary: