

## Course guide

### 310710 - 310710 - Stone Materials

**Last modified:** 10/04/2025

**Unit in charge:** Barcelona School of Building Construction  
**Teaching unit:** 753 - TA - Department of Architectural Technology.

**Degree:** BACHELOR'S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2019).  
(Compulsory subject).

**Academic year:** 2024    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

#### LECTURER

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**Others:** JUDIT RAMÍREZ-CASAS  
MARIA ANTONIA NAVARRO EZQUERRA  
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#### PRIOR SKILLS

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In order to be able to take the subject of stone materials and obtain good results in learning, it is very important to have passed the subject of Materials, Chemistry and Geology. Basic knowledge of construction is also necessary.

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

1. FB-4 Knowledge of the chemical features of the materials used in construction, its fabrication processes, the methodology of the trials for determining its features, its geologic origin, the environmental impact, the recycling and the residues management.
2. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.

**Transversal:**

3. 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.

#### TEACHING METHODOLOGY

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The directed self-learning hours consist on the one hand in teaching theoretical classes (big group) where the professor does a brief explanation for introducing the general learning objectives related with the basic concepts of the subjects. Subsequently and by means of practical exercises the professor tries to encourage and involve the students so that they take part actively in their learning. It is used support material in detailed educational plan format, by ATENEA. Learning objectives by contents, concepts, examples, evaluation activities and directed learning schedule and bibliography. On the other hand, the directed learning hours also consist on teaching problem classes (medium group) where normally the work is done in groups of 3 to 4 members, by means of the resolution of exercises and numerical problems related with the specific learning objectives of each content of the subject.

During the activities fulfilment it is pretended to incorporate some generic competences, like teamwork or effective oral communication. For that there will be developed cooperative learning techniques at class. The lab practices allow to develop basic skills of instruments kind, as well as introduce the students to the scientific method implementation in the resolution of lab problems. Generally after each session out of class tasks are proposed, the students must work individually or in group these tasks, which are the basis of the directed activities.

There also have to be considered the rest of the autonomous self-learning hours like the ones dedicated to the guided readings, the resolution of the proposed problems and the self-learning questionnaires of the different contents by virtual campus ATENEA.

## LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, students should be able to:

Describe the characteristics and properties of the different materials.

Carry out a correct and backed up selection of materials in the construction sector.

Identify and use the current law which regulates the construction materials.

Apply the sustainable and environmental criteria related to the different life cycle phases.

## STUDY LOAD

Type	Hours	Percentage
Hours medium group	9,0	6.00
Self study	90,0	60.00
Hours small group	21,0	14.00
Hours large group	30,0	20.00

**Total learning time:** 150 h

## CONTENTS

### C1: Binders

#### Description:

Content in this term:

Basic concepts for binder comprehension. Binder materials study (gypsum, lime and cement) from raw materials and the process of manufacturing to the hardening process. Types, applications and uses.

Ecological and environmental characteristics of binders.

Regulations of reference. Continue to learn technical vocabulary.

#### Related activities:

Laboratory 1 (L1). Students will carry out in the laboratory experimental activities with plasters, limes and cements to check the different performances. The class group will be divided into two halves to facilitate the participation of all group members. The activity will be evaluated within the percentage of class attendance and participation.

Practice 1 (P1). This activity consists of a theoretical-practical session with library staff to achieve initial knowledge in the management of information resources. This knowledge will be applied in the course work. The activity will be evaluated within the percentage of class attendance and participation.

Questionnaire 1 (Q1). Questionnaire in the ATENEA environment on the subject of gypsum (plasters). Will be part of the note QT (15%)

Questionnaire 2 (Q2). Questionnaire in the ATENEA environment, topic limes. It will be part of the QT note (15%)

Questionnaire 3 (Q3). Questionnaire in the ATENEA environment on the subject of cements. Will be part of the note QT (15%)

#### Full-or-part-time: 50h

Theory classes: 10h

Practical classes: 7h

Laboratory classes: 3h

Self study : 30h

## C2: Aggregates, additives and additions

### Description:

Content in this term:

Study of non-agglomerating materials involved in the manufacture of conglomerates. Characteristics and properties, their role in the conglomerate, types and applications.

In the subject corresponding to the aggregates, granulometric studies will be carried out for the manufacture of concretes.

Ecological and environmental aspects of these materials.

Reference standards.

### Related activities:

Practice 2 (P2). This activity consists of each student having to make the necessary excel worksheet in order to be able to make the granulometric studies of the aggregates. The content of this practical session will be evaluated in the partial exam.

Practice 3 (P3). The activity will consist of making a granulometric study with the excel sheet that each student has prepared. The content of this practical session will be evaluated in the partial exam.

Questionnaire 4 (Q4). Questionnaire in the ATENEA environment topic: aggregates. Will be part of the note QT (15%)

### Full-or-part-time: 46h

Theory classes: 6h

Practical classes: 7h

Laboratory classes: 3h

Self study : 30h

## C3: Conglomerates

### Description:

Content in this term:

Conglomerate materials study (mortar and conventional and special concrete), type, characteristics (in fresh and hard phases), properties and uses. Dosages of mortars and concretes.

Ecological and environmental aspects of the conglomerates.

Normative of reference.

### Related activities:

Practice 4 (P4). This activity consists of doing mortar dosage exercises. The content of this practical session will be evaluated in the midterm.

Practice 5 and 6 (P5-P6). The activity will consist of designing a concrete and making its dosage. The content of this practical session will be evaluated in the partial examination.

Questionnaire 6 (Q6). Questionnaire in the ATENEA environment on mortars. It will be part of the note QT (15%)

Questionnaire 7 (Q7). Questionnaire in the ATENEA environment on fresh concrete. It will be part of the note QT (15%)

Questionnaire 8 (Q8). Questionnaire in the ATENEA environment on hardened concrete. It will be part of the note QT (15%)

Questionnaire 9 (Q9). Questionnaire in the ATENEA environment on special concretes. It will be part of the note QT (15%)

Laboratory 2 (L2). Students will carry out in the laboratory experimental activities with different types of mortars, different dosages and with different conglomerates. The class group will be divided into two halves to facilitate the participation of all group members. The activity will be evaluated within the percentage of class attendance and participation.

Laboratory 3 (L3). Students will carry out in the laboratory experimental and testing activities concerning concrete in both fresh and hardened state. The class group will be divided into two halves to facilitate the participation of all group members. The activity will be evaluated within the percentage of class attendance and participation.

### Full-or-part-time: 54h

Theory classes: 14h

Practical classes: 7h

Laboratory classes: 3h

Self study : 30h

## ACTIVITIES

### A6 WORK ON PRE-FABRICATED PRODUCTS

#### Description:

##### Objective

The objective of this work is twofold: firstly, to acquire a thorough knowledge of a specific prefabricated product and, secondly, to gain an overview of the maximum number of prefabricated products that can be used in the construction sector.

The work will consist of the realization of a monographic poster of the chosen prefabricated product. The posters will have to show in a simple, synthetic and graphic way, and at the same time in a rigorous way, all the information of the product, according to the indications of this heading.

##### Previous knowledge:

Search for information that it is a prefabricated product. Know what types there are. Acquire the lexicon and terminology of the different products, components, uses, etc. And finally, to acquire a general vision of the chosen prefabricated product.

#### Material:

The content of the poster will be as follows:

1. Definition of the product
2. Materials that compose it
3. Material specifications
4. Dosages of the different conglomerates.
5. Auxiliary materials.
6. Graphic documentation of the products, dimensions, forms, etc ...

#### Delivery:

- 1.- General information dossier of the product obtained from the research carried out in the information skills session. (Value 5%)
- 2.- Expansion in the materials that make up the product and its specifications (Value 5%)
- 3.- Expansion in the dosages and manufacturing system used. Tests of internal control of the product (Value 5%)
- 4.- Draft of the poster with all the information included (Value 5%)

These deliveries are scorable.

The final document will be in poster format.

The poster must be very graphic and synthetic. Definitions and descriptions should be in short sentences. The photographs and graphics must be of maximum quality and always with their source and description. The size of the poster should be A1, vertical or horizontal as appropriate.

The work will be evaluated in the following way:

20% corresponding to the different deliveries throughout the course. (Evaluators: teachers of the subject). There will be 4 deliveries and each one will be worth 5%.

40% corresponding to the content of the poster. (Evaluators: subject teachers)

40% Corresponding to the presentation and defence of the poster in class by each work group.

20% evaluation made by the teachers of the subject

10% Evaluation made by the partners.

10% Personal evaluation by library

#### Full-or-part-time: 14h

Self study: 10h

Guided activities: 4h

## GRADING SYSTEM

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The final grade is the sum of the following subgrades:

$$N_{\text{final}} = 30\%N_{p1} + 15\%Q_T + 20\%N_{p2} + 5\%Q_{AP} + 30\%N_{p3}$$

$N_{\text{final}}$ : final qualification.

$N_{p1}$ : first partial evaluation

$Q_T$ : grading of thematic questionnaires throughout the course

$N_{p2}$ : work qualification with continuous evaluation.

$N_{p3}$ : Final exam

$Q_{AP}$ : grading attendance and class participation

The partial and final tests consist of one part with questions on concepts associated with the learning objectives of the subject for knowledge or theoretical understanding and another part of test or short questions and the completion of exercises.

The evaluation of the questionnaires consists of making different questionnaires of each of the subjects once they have been explained in class. They are individual and of a formative nature, carried out throughout the course, in the classroom and/or outside it.

The evaluation of the work will be carried out throughout the course by means of partial deliveries. The subject will be about prefabricated mortar and/or concrete products. It will be evaluated in a group of 2-3 students. The final result will be an explanatory poster of the developed product and the members of the group will present it to the whole class. A part of the final grade will be the one obtained from the peer evaluation.

Finally, the evaluation of the attendance and participation in class will also be continuous.

## EXAMINATION RULES.

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In order to carry out some activities (see planning of the current course for the corresponding course), it will be essential that students have formed groups of 2 or maximum 3 people. These groups will be formed on the first day of class.

It's a necessary condition to have done at least 2/3 of the activities and tests planned in order to pass the course. If any of the laboratory or continuous assessment activities are not carried out, they will be considered as not scored.

## BIBLIOGRAPHY

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### Basic:

- Arredondo y Verdú, Francisco. Estudio de materiales. Madrid: Instituto Eduardo Torroja de la Construcción y del Cemento, 1983. ISBN 8474930758.
- Arredondo Verdú, F. Yesos y cal. Madrid: E.T.S. Ingenieros de Caminos, 1991. ISBN 8474931398.
- Garate Rojas, I. Artes de la cal. 2a. ed. Madrid: Munilla-Lería, 2002. ISBN 8489150508.
- Galán Gutiérrez, L.; Amador Blanco, J. Cementos. 2a ed. Madrid: EATM, 1993. ISBN 8460405141.
- Fernández Rodríguez, José María. Introducción a los cementos. Córdoba: Servicios de publicaciones de la Universidad de Córdoba, 2004. ISBN 8478017313.
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- Morteros: guía general. Madrid: Asociación Nacional de Fabricantes de Mortero, 2003.
- Rodríguez-Mora, Oscar. Morteros para fábricas. Madrid: Asociación Nacional de Fabricantes de Mortero, 2004.
- Azkárate, I. ...[ et al.]. Morteros especiales. Madrid: Asociación Nacional de Fabricantes de Mortero, 2005.
- Peck, M. Hormigón: diseño, construcción, ejemplos. Barcelona: Gustavo Gili, 2007. ISBN 9788425221811.
- Bustillo Revuelta, M. Hormigones y morteros. Madrid: Ed. Fuego, 2008. ISBN 9788493527914.
- Montero Fernández de Bobadilla, E. Puesta en obra del hormigón : exigencias básicas. Toledo: Consejo General de la Arquitectura Técnica de España, 2006. ISBN 8460996840.
- Neville, A.M. Tecnología del concreto. México: Noriega-Limusa, 1988. ISBN 9684640315.

### Complementary:

- Martín Sisí, Mónica ... [et al.]. Guía práctica de la cal y el estuco. León: Editorial de los oficios, 1998. ISBN 8493042706.
- Calavera Ruiz, J. ... [et al.]. Ejecución y control de estructuras de hormigón. Madrid: Intemac, 2004.



## RESOURCES

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### Audiovisual material:

- CES EduPack 2010: Standard & sustainability. Cambridge: Granta Design, 2010. [http://cataleg.upc.edu/record=b4906900~S1\\*cat](http://cataleg.upc.edu/record=b4906900~S1*cat)

### Other resources:

EHE-08 Instrucción de hormigón estructural.(2008) Madrid: Ediciones de autor técnico

RC-16.Instrucción para la recepción de cementos.(2016). Madrid: Ministerio de Fomento

Código Técnico de la Edificación. Madrid : Ministerio de Vivienda : Boletín Oficial del Estado, 2006

Teachers material at intranet.

Web pages:

[www. atedy.es](http://www.atedy.es)

[www. calespachs.com](http://www.calespachs.com)

[www. lime.org](http://www.lime.org)

[www. anfah.es](http://www.anfah.es)

[www. sika.es](http://www.sika.es)

[www. afam-morteros.com](http://www.afam-morteros.com)