

Course guides

310013 - 310013 - Construction II

Last modified: 14/04/2020

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

Degree: BACHELOR'S DEGREE IN BUILDING CONSTRUCTION SCIENCE AND TECHNOLOGY (Syllabus 2009).
(Compulsory subject).
BACHELOR'S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2015).
(Compulsory subject).

Academic year: 2020 **ECTS Credits:** 3.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Gómez Soberón, José Manuel Vicente

Others: Anguera de Carlos, Enric

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
2. FE-13 Ability to apply the technical regulation to the construction process, and generate documents of technical specification in the constructive procedures and methods of buildings.
3. 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:

4. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
5. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.

TEACHING METHODOLOGY

The directed learning hours consist on the one hand in teaching theoretical classes (big group) where the professor does a brief exposition for introducing the general learning objectives related with the basic concepts of the subject. Afterwards and by means of practical exercises the professor tries to motivate and involve the students so that they can participate 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. There will be practical classes (medium group) where the students work, generally in groups of 2 to 3 members, by means of the resolution of exercises related with the specific learning objectives of each content of the subject.

During these exercises sessions it is pretended to incorporate some generic competences, like teamwork. For that there will be developed cooperative learning techniques at class. 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, the students should be able to:

- . To determine the most appropriate building options for solving a specific building problem below ground.
- . To explain the meaning of the concepts and basic parameters of the soil mechanics related with architectural building. To connect the knowledge of the soils with the building processes.
- . To define the uses, the potentialities and the limitations of the building solutions related with the construction below ground.
- . To identify the cause-effect relationship of the soil constructions for avoiding or correcting diseases.
- . To use suitably the technical resources related to the environment, the energy saving and the management and valuing of the construction wastes.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	7,5	10.00
Hours large group	15,0	20.00
Guided activities	7,5	10.00
Self study	45,0	60.00

Total learning time: 75 h

CONTENTS

C1 Superficial foundations.

Description:

This content works:

- Introduction to the concept of shallow foundation.
- Types and general protocol design.
- Building design of footings, slabs and beams bracing.

Related activities:

There will be done the activity 1, which correspond to a individual continous evaluation test at class during the medium or small group sessions.

There will be done the activity 3 in group, which correspond to the medium or small group sessions at class. It is specially influential the fulfilment, by the student, of construction details.

Full-or-part-time: 19h 30m

Theory classes: 3h 30m

Practical classes: 2h

Guided activities: 2h

Self study : 12h



C2 Deep foundations.

Description:

This content works:

- Terms of Use of the piles. Types and compatibilities.
- Criteria for assembly and execution control of the piles.
- Building design of pile caps and braces.

Related activities:

There will be done the activity 1, which correspond to a individual continuous evaluation test at class during the medium or small group sessions.

There will be done the activity 3 in group, which correspond to the medium or small group sessions at class. It is specially influential the fulfilment, by the student, of construction details.

Full-or-part-time: 19h

Theory classes: 3h 30m

Practical classes: 2h

Guided activities: 2h

Self study : 11h 30m

C3 Retaining walls.

Description:

This content works:

- Introduction to the concept of pressures ground.
- Different types of retaining walls, building design and mechanical requirements.
- Different formwork systems retaining walls.
- Earthworks.

Related activities:

There will be done the activity 2, which correspond to a individual continuous evaluation test at class during the medium or small group sessions.

There will be done the activity 3 in group, which correspond to the medium or small group sessions at class. It is directed to develop the phases of perimeter retaining formation and the emptying of the plot.

Full-or-part-time: 20h 30m

Theory classes: 4h 30m

Practical classes: 2h

Guided activities: 2h

Self study : 12h



C4 Treatments to flooring.

Description:

This content works:

- Control of underground waters.
- Improved terrain.
- Waterproofing of walls.

Related activities:

There will be done the activity 2, which correspond to a individual continuous evaluation test at class during the medium or small group sessions.

There will be done the activity 3 in group, which correspond to the medium or small group sessions at class. It is specially influential the fulfilment, by the student, of construction details the waterproofing of walls and to determine the building solutions for controlling the subterranean water.

Full-or-part-time: 16h

Theory classes: 3h 30m

Practical classes: 1h 30m

Guided activities: 1h 30m

Self study : 9h 30m

ACTIVITIES

A1 INDIVIDUAL TEST TO CLASSROOM ASSESSMENT: TEST.

Description:

Individually, the students will do a 30 minutes test, at the end of the C1 and C2 contents.

Specific objectives:

At the end of the activity, the student should be able to:

- Identify the behaviour of the soils dependant on the foundations typologies.
- Define the elements wich form the superficial foundations.
- Identify the properties of the foundations elements: Piles and pile caps.
- Define the typology of piles depending on the specific needs.
- Understand the construction details of the superficial and deep foundations.
- Solve construction details depending on the specific needs.

Material:

Self-learning questionnaire with multiple choice and with the notes of the available topics (PDF) by ATENEA.

Delivery:

It will worth the 5% of the final mark.

Full-or-part-time: 0h 30m

Self study: 0h 30m



A2 INDIVIDUAL TEST TO CLASSROOM ASSESSMENT: TEST.

Description:

Individually, the students will do a 30 minutes test, at the end of the C3 and C4 contents.

Specific objectives:

At the end of the activity, the student should be able to:

- Identify, among others, the necessary conditions for using the different land containment systems.
- Define the elements which form the retaining walls and/or slurry walls (the different types).
- Compare and distinguish the different water extraction systems below ground.
- Identify the different waterproofing systems of walls.
- Solve construction details depending on the specific needs.

Material:

Self-learning questionnaire with multiple choice and with the notes of the available topics (PDF) by ATENEA.

Delivery:

It will worth the 5% of the final mark.

Full-or-part-time: 0h 30m

Self study: 0h 30m

(ENG) A3 TREBALL EN EQUIP A L'AULA I FORA DE L'AULA

Description:

In this activity the students will work in groups of maximum 3 members.

Realization of an exercise with a construction solution proposal for the foundation of a building and based on the geotechnical study, it will be decided the foundation typology.

To establish the geotechnical parameters and define piles types and do the construction design of a pile cap. To set out the foundation plan scheme.

Graphic process and written justification of the construction phases of the perimeter containments and the emptying of the plot. The practice will be done in and out of class.

It will be explained by the corresponding report.

Note Activity 3 will be the average of the three partial marks (3.1, 3.2, and 3.3)

Specific objectives:

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

- Identify the behaviour of the soils dependant on the foundation typologies.
- Define the elements which form the superficial foundations.
- Understand construction details of foundations.
- Solve construction details depending on the specific needs.
- To write correctly a technical report related with construction aspects below ground.
- Distinguish between the uses and the appropriate applications, or not, of the foundation and containment systems depending on the soil features.
- To understand in a qualifying way the factors which can influence in the mechanical behaviour of the foundations.

Material:

Besides the practical examples developed by the faculty and available in Atenea Campus, the students can get the subject notes and the Current Regulations.

Delivery:

The activity will be object of monitoring by the faculty. The activity 3 worths the 30% of the final mark.

Full-or-part-time: 13h 30m

Practical classes: 3h 30m

Guided activities: 3h

Self study: 7h



A4 GROUP WORK DIRECTED LEARNING OUTSIDE THE CLASSROOM: BUILDING PROCESS ANALYSIS OF UNDERGROUND.

Description:

In groups of 3 students.

The groups of work will hand over a commentated photographic collection of the different parts of the construction process below ground of a construction work (real) to choose by the student.

Specific objectives:

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

- Understand the construction details of the construction work corresponding to the different phases of building below ground.
- Identify each one of the elements which are being builded below ground.

Material:

Subject notes, Current Regulations and Bibliography.

Delivery:

It will worth a 10% of the final mark.

Full-or-part-time: 7h

Guided activities: 7h

A5 HALF TERM EVALUATION (CONTENTS C1 and C2).

Description:

The students will be evaluated individually by a graphic and written exam; which will be a general application. The MIDTERM exam consist of one part with questions about associated concepts to the learning objectives of the subject regarding to the knowledge and comprehension, and a set of application exercises. The students will have 2 hours for doing the exam.

Specific objectives:

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

- Deduce correctly the construction system proposed.
- Identify and use examples of the different techniques of superficial and deep foundations.

Material:

Content notes available in ATENEA.

Delivery:

It will be handed over at the end and it worths a 15%.

Full-or-part-time: 2h

Theory classes: 2h



FINAL EVALUATION A6 (CONTENTS C3 and 4).

Description:

The students will be evaluated individually by a graphic and written exam; which will be a general application. The FINAL exam consist of one part with questions about associated concepts to the learning objectives of the subject regarding to the knowledge and comprehension, and a set of application exercises. The students will have 2 hours for doing the exam.

Specific objectives:

At the end of the activity, the student should be able to:

- Deduce correctly the construction system proposed.
- Identify and use examples of the different techniques for containment systems, soil improvement, subterranean water regulation and waterproofing of walls.

Material:

Content notes available in ATENEA.

Delivery:

It will be handed over at the end and it worths a 20%.

Full-or-part-time: 2h

Theory classes: 2h

GRADING SYSTEM

It will be individually evaluated each content by a test. The combination of tests (TEST) provides the 10% of the final mark, and will be distributed with this proportion:

- C1 and C2 contents test (activity 1) worths the 5%.
- C3 and C4 contents test (activity 2) worths the 5%.
- The C1, C2, C3 and C4 practice (activity 3) worths the 30%.
- The directed learning group work (AD) (Activity 4) worths the 10%.
- The students will be individually evaluated (activity 5) by means of a written and graphic exam (EP) which will be a general application of the subject and worths the 25% of the final mark. It will be done during the fixed midterm exam period.
- The students will be individually evaluated (activity 6) by means of a written and graphic exam (EF) which will be a general application of the subject and worths the 35% of the final mark. It will be done during the fixed final exam period.

EXAMINATION RULES.

If some of the continous evaluation activities is not done, it will be considered as non-marked.



BIBLIOGRAPHY

Basic:

- Calavera Ruiz, J. Muros de contención y muros de sótano. 3a ed. Madrid: Instituto Técnico de Materiales y Construcciones, 2001.
- Jiménez Salas, J.A.; Justo Alpañes, J. L. de; Serrano González. Geotecnia y cimientos. Madrid: Rueda, 1971-1980.
- Graux, D. Fundamentos de mecánica del suelo, proyectos de muros y cimentaciones, geotecnia aplicada. 2a ed. Barcelona: Técnicas asociados, 1975.
- González Caballero, Matilde. El Terreno [on line]. Barcelona: Edicions UPC, 2001 [Consultation: 03/10/2014]. Available on: <http://hdl.handle.net/2099.3/36297>. ISBN 9788498800920.
- Schneebeli, Georges. Muros pantalla, técnicas de realización, métodos de cálculo. Barcelona: Editores Técnicos Asociados, 1981.
- Davidian, Z. Pilotes y cimentaciones sobre pilotes, exposición de distintos tipos de pilotes, capacidad portante y estabilidad de los pilotes, datos numéricos, ejemplos de aplicaciones prácticas. 3a ed. Barcelona: Editores Técnicos Asociados, 1982.
- CTE-SE-C, seguridad estructural, cimientos, aplicación a edificios de uso residencial vivienda-DAV. Madrid: Consejo Superior de Colegios de Arquitectos de España, 2007.
- Jiménez Montoya, P.; García Meseguer, A.; Morán Cabré, F.. Hormigón armado. 15a ed. Barcelona: Gustavo Gili, 2009. ISBN 8425223075.
- Rodríguez Ortiz, J.M. Curso aplicado de cimentaciones. 7a ed. Madrid: Servicio de publicaciones del Colegio Oficial de Arquitectos de Madrid, 1996.
- Soil mechanics design manual 7.01 [on line]. Virginia: Naval Facilities Engineering Command. US. Navy, 1986 [Consultation: 21/06/2017]. Available on: http://web.mst.edu/~rogersda/umrcourses/ge441/dm7_01.pdf.

Complementary:

- Bárbara, J; García Ferrer, M.; Oliveras, J. Ma. Muros pantalla, métodos constructivos y descripciones generales. [S.l.]: [S.n.], 1977.
- Reimbert, Marcel; Reimbert, André. Presiones y asentamientos de las cimentaciones superficiales, cálculo de las zapatas, estado elasto-plástico de los suelos. Barcelona: Editores Técnicos Asociados, 1978.
- Mañà i Reixach, F. El Gros de l'obra [on line]. Barcelona: UPC, 2000 [Consultation: 09/03/2015]. Available on: <http://hdl.handle.net/2099.3/36296>.