

Course guide

210126 - CONST II - Construction II

Last modified: 14/12/2023

Unit in charge: Barcelona School of Architecture
Teaching unit: 753 - TA - Department of Architectural Technology.
Degree: DEGREE IN ARCHITECTURE STUDIES (Syllabus 2014). (Compulsory subject).
Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: ORIOL PONS VALLADARES

Others:

Primer quadrimestre:

POL JORDÀ SALA - Grup: 1SM2, Grup: 1ST2

GEMMA MUÑOZ SORIA - Grup: 1SM2, Grup: 1ST2

ORIOL PONS VALLADARES - Grup: 1SM2, Grup: 1ST2

GERARD TORRENT IZQUIERDO - Grup: 1SM2, Grup: 1ST2

Segon quadrimestre:

POL JORDÀ SALA - Grup: 2SM1, Grup: 2ST1

GEMMA MUÑOZ SORIA - Grup: 2SM1, Grup: 2ST1

ORIOL PONS VALLADARES - Grup: 2SM1, Grup: 2ST1

GERARD TORRENT IZQUIERDO - Grup: 2SM1, Grup: 2ST1

REQUIREMENTS

CONSTRUCCIÓ I - Prerequisit

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

ET1. Translation from Spanish slope
ET15. Translation from Spanish slope
ET16. Translation from Spanish slope
ET2. Translation from Spanish slope
ET6. Translation from Spanish slope
ET7. Translation from Spanish slope
ET8. Translation from Spanish slope
EP19. Translation from Spanish slope
ET10. Translation from Spanish slope
ET11. Translation from Spanish slope
ET12. Translation from Spanish slope
ET14. Translation from Spanish slope
ET17. Translation from Spanish slope
ET18. Translation from Spanish slope
ET19. Translation from Spanish slope
ET20. Translation from Spanish slope
ET21. Translation from Spanish slope
ET22. Translation from Spanish slope
ET3. Translation from Spanish slope
ET4. Translation from Spanish slope
ET5. Translation from Spanish slope
ET9. Translation from Spanish slope

Generical:

CG4. Translation from Spanish slope
CG5. Translation from Spanish slope
CG6. Translation from Spanish slope
CG7. Translation from Spanish slope
CG3. Translation from Spanish slope

Transversal:

CT1. Translation from Spanish slope
CT2. Translation from Spanish slope
CT3. Translation from Spanish slope
CT4. Translation from Spanish slope
CT5. Translation from Spanish slope
CT6. Translation from Spanish slope

Basic:

CB1. Translation from Spanish slope
CB2. Translation from Spanish slope
CB3. Translation from Spanish slope
CB4. Translation from Spanish slope
CB5. Translation from Spanish slope

TEACHING METHODOLOGY

During its theoretical sessions, this course combines Lectures, master lessons and interactive learning activities. Practical lessons include active and cooperative learning activities, based on projects and puzzles. There are individual and team work exercises, which are progressively available for students in the course intranet along with evaluation results. These methodologies are distributed in the following way:

Classroom activities Group Hours per week

Lectures and interactive activities Large, Maximum 90 students 2

Individual exercises Medium, Maximum 50 students 1,5

Team work Small, Maximum 30 students 1,5

Out of class activities Hours per semester

Self-motivated learning 98

LEARNING OBJECTIVES OF THE SUBJECT

The general objective of this course is that students learn about construction as the process through which an architect materializes the plans and/or digital models of her/his design. Thus students understand the importance of incorporating construction aspects during the design process. Taking these aspects into account not only enables the construction of the building but also improves the final result. In this sense, this course analyzes cases in which construction issues have been considered during the design process instead of adding these aspects after everything else had already been decided. In consequence, the buildings studied have had an easier and more sustainable construction process, with improvements incorporated in their construction and architectural shape, as well as other design aspects.

Specific Course Objectives plan for students are to learn the necessary knowledge and skills in order to:

1. Design architectural buildings taking into account their foundation, structure and retaining walls, which are the main part of any construction process.
2. Be able to identify which systems and elements within the main part of the construction process would be recommended for use in different theoretical and practical cases.
3. Develop constructive solutions within the main part of the construction process for use in different theoretical and practical cases.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	11,0	7.33
Guided activities	12,0	8.00
Hours large group	32,0	21.33
Hours small group	11,0	7.33
Self study	84,0	56.00

Total learning time: 150 h

CONTENTS

INTRODUCTION

Description:

This course is specialized in the construction of the main part of the construction process and its relation with its Architecture design. This course is part of a five course set with its predecessors ?Bases? and ?Construction I? and the subsequent ?Construction III? and ?Construction IV?. Course content is essential in the study and exercise of Architecture; course alumni have perceived this course contents in this manner. This course program is divided into two parts over the duration of its semester length and includes the following content topics:

1. The main part of the construction process and its relation with its Architecture design.

Full-or-part-time: 1h

Theory classes: 1h

FIRST PART

Description:

- 2) Site ground soil being part of the foundation;
- 3) Obtaining values for the foundation soils;
- 4) Geotechnical report;
- 5) Retaining walls;
- 6) Pile walls;
- 7) Foundation design criteria;
- 8) Shallow foundations;
- 9) Well foundation;
- 10) Piles and micropiles.

Full-or-part-time: 20h

Theory classes: 20h

SECOND PART

Description:

- 11) Floor structures;
- 12) Brick masonry walls;
- 13) Concrete block walls;
- 14) Poured reinforced concrete walls;
- 15) Timber wall panels;
- 16) Precast wall panels;
- 17) Reinforced concrete Frame structures;
- 18) Steel structures.

Full-or-part-time: 23h

Theory classes: 23h

GRADING SYSTEM

ASSESSMENT during the course (with everything handed in and presented)

Theory block grade:

$$P=(T1+T2)/2$$

T1: solving cases individually (T1);

T2: solving cases individually (T2);

Exercises block grade: $P=(P1+P2+P3)/3$

Course qualification: $N_{course}=(a \square \square \square T + b \square P + c \square C)/2$

$a = 0,50$; $b = 0,34$; $c = 0,16$

C: Arithmetic average from Atenea questionnaires and activities made during classes, having a double weight the activities done in class compared to the questionnaires

Grade C can be improved with a key concept video (talk to the professor in September or October)

Final ASSESSMENT: - compulsory if anything not handed in or not presented

- optional to improve qualification

Continuous assessment

Continuous assessment will be based on the work carried out by the student during the academic year, through the submission of assignments or the performance of written and/or oral tests, according to the criteria and timetable established.

Final assessment

If the continuous assessment is not positive, a second assessment may be carried out, which will consist of a final overall test in the established methodology according to the criteria of the lecturer in charge (written or oral test and/or submission of assignments).

Telematic continuous assessment

In online teaching situations, continuous assessment will be carried out synchronously and asynchronously, by the methods established by the University and the School, with a periodic record of academic activity by submitting assignments, forums, questionnaires or any other means provided by the Atenea platform, or the alternative tools provided to the teaching staff. In situations in which this telematic teaching takes place when face-to-face teaching has already begun, or for non-academic reasons, any alterations to the weightings or regular teaching control systems will be communicated in detail to all students on the Atenea platform for every subject.

Final telematic assessment

If the continuous telematic assessment is not positive, a second assessment may be carried out consisting of a final overall test in telematic format to be established in accordance with the criteria of the lecturers in charge and the ICT resources and tools provided by the University or the School. The measures for adapting to distance teaching will be implemented in accordance with ICT security and personal data protection criteria to ensure compliance as regards Personal Data

Protection legislation (RGPD and LOPDGDD).

BIBLIOGRAPHY

Basic:

- "DB-SE: Seguridad estructural". Código Técnico de la Edificación [on line]. Madrid: Ministerio de la Vivienda, 2008. [Consultation: 10/03/2022]. Available on: <https://www.codigotecnico.org/QueEsCTE/QueEsEICTE.html>.- Acondicionamiento del terreno. Cimentaciones: diseño, cálculo, construcción, valoración, control, mantenimiento. Madrid: Ministerio de Fomento, 2000. ISBN 8474338107.
- Estructuras: diseño, cálculo, construcción, valoración, control, mantenimiento. Madrid: Ministerio de Obras Públicas, Transportes y Medio Ambiente, 1996. ISBN 8474335965.
- Mañà i Reixach, Fructuós. El gros de l'obra: uns apunts de construcció [on line]. Barcelona: Edicions UPC, 2000 [Consultation: 06/05/2015]. Available on: <http://hdl.handle.net/2099.3/36296>. ISBN 84-8301-370-3.
- "DB-HS: Salubridad". Código Técnico de la Edificación [on line]. Madrid: Ministerio de la Vivienda, 2008. [Consultation: 10/03/2022]. Available on: <https://www.codigotecnico.org/QueEsCTE/QueEsEICTE.html>.- de Llorens Duran, Josep Ignasi; Pons Valladares, Oriol. El Terreny i l'estudi geotècnic [on line]. Barcelona: Iniciativa Digital Politècnica, 2015 [Consultation: 07/07/2022]. Available on: <https://upcommons.upc.edu/handle/2099.3/36882>. ISBN 9788498805208.
- Llorens Duran, Josep Ignasi de; Pons Valladares, Oriol. El Terreno y el estudio geotécnico [on line]. Primera edición. Barcelona: Iniciativa Digital Politècnica. Oficina de Publicacions Acadèmiques Digitals de la UPC, abril de 2021 [Consultation: 07/07/2022]. Available on: <https://upcommons.upc.edu/handle/2117/344633>. ISBN 9788498809282.

Complementary:

- Pfammatter, Ulrich. Building the future: building technology and cultural history from the Industrial Revolution until today. Munich [etc.]: Prestel, 2008. ISBN 9783791339269.
- Watts, A. Modern Construction Handbook [on line]. Third edition. Basel: Birkhäuser, [2018] [Consultation: 30/07/2020]. Available on: <https://doi-org.recursos.biblioteca.upc.edu/10.1515/9783035617085>. ISBN 9783035616903.
- Addis, Bill. Building: 3000 years of design, engineering and construction. London: Phaidon, 2007. ISBN 9780714841465.
- Orton, Andrew. The way we build now: form, scale and technique. London [etc.]: E & FN Spon, 1991. ISBN 0419157808.
- Calavera Ruiz, José. Muros de contención y muros de sótano. 3ª ed. Madrid: Instituto Técnico de Materiales y Construcciones, 2001. ISBN 84-88764-10-3.
- Pujadas-Gispert, E.; Sanjuan-Delmás, D.; de la Fuente, A.; Moonen, S.P.G (Faas); Josa, Alejandro. "Environmental analysis of concrete deep foundations: Influence of prefabrication, concrete strength, and design codes". Journal of Cleaner Production [on line]. 2020, vol. 244, núm. 20 [Consultation: 22/06/2020]. Available on: <https://doi.org/https://doi.org/10.1016/j.jclepro.2019.118751>.- Hanes, Katrin. Basics Concrete Construction [on line]. Berlin, Basel: Birkhäuser, 2015 [Consultation: 02/09/2020]. Available on: <https://doi-org.recursos.biblioteca.upc.edu/10.1515/9783035612783>. ISBN 9783035603620.
- Pfeifer, Günter[et al.]. Masonry construction manual [on line]. Basel [etc.]; München: Birkhäuser; Detail, 2001 [Consultation: 08/05/2020]. Available on: https://ia800906.us.archive.org/16/items/Masonry_Construction_Manual/Masonry_Construction_Manual.pdf. ISBN 3764365439.
- Llorens Duran, Josep Ignasi; Soldevila Barbosa, Alfons. Construcció amb bloc de formigó [on line]. Barcelona: Edicions UPC, 2003 [Consultation: 06/05/2015]. Available on: <http://hdl.handle.net/2099.3/36295>. ISBN 84-8301-426-2.
- Cassinello Pérez, Fernando. Construcción: hormigonería. 2ª ed. Madrid; Alarcón: Instituto Juan de Herrera; Rueda, 1996. ISBN 84-920297-4-9.
- "Instrucción de Hormigón Estructural: EHE-08". Real Decreto 1247/2008 de 18 de julio, por el que se aprueba la instrucción de hormigón estructural (EHE-08) [on line]. Madrid: Publicaciones del Ministerio de Fomento, 2009. [Consultation: 06/07/2012]. Available on: <http://www.boe.es/buscar/doc.php?id=BOE-A-2008-14167>.- Schulitz, Helmut C.; Sobek, Werner; Habermann, Karl J.. Steel construction manual. Basel [etc.]; München: Birkhäuser; Detail, 2000. ISBN 37643619816.
- Rodríguez Liñán, Carmen. Pantallas para excavaciones profundas. Sevilla: Escuela Técnica Superior de Arquitectura de Sevilla, 1995. ISBN 84-88988-03-6.
- González Caballero, Matilde. El terreno [on line]. Barcelona: Edicions UPC, 2001 [Consultation: 06/05/2015]. Available on: <http://hdl.handle.net/2099.3/36297>. ISBN 84-8301-530-7.
- Regalado Tesoro, Florentino. Los forjados de los edificios: pasado, presente y futuro. Alicante: CYPE, 1999. ISBN 8493069620.
- Pujadas Gispert, Ester. Prefabricated foundations for housing applied to room modules [on line]. Barcelona: Universitat Politècnica de Catalunya. Departament de Tecnologia de l'Arquitectura, 2016 [Consultation: 02/09/2020]. Available on: <http://hdl.handle.net/2117/96274>.
- O. Pons; M. M. Casanovas-Rubio; J. Armengou; and A. de la Fuente. "Sustainability-Driven Decision-Making Model: Case Study of Fiber-Reinforced Concrete Foundation Piles". ASCE [on line]. 2021, vol. 147, núm.10 [Consultation: 07/07/2022]. Available on: <https://ascelibrary.org/doi/10.1061/%28ASCE%29CO.1943-7862.0002073>.

RESOURCES

Other resources:

The materials and documents of the subject may be written indistinctly in any languages of instruction.