Course guide
310408 - 310408 - New Industrialised Techniques Applied to Construction

Last modified: 07/07/2025

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

Degree: MASTER'S DEGREE IN ADVANCED BUILDING CONSTRUCTION (Syllabus 2014). (Optional subject).

Academic year: 2025 **ECTS Credits:** 5.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: Paris Viviana, Oriol

Others: Paris Viviana, Oriol
Martín Goñi, Paula

PRIOR SKILLS

Grade in aspects related with the architecture, the construction or the civil engineering.

REQUIREMENTS

Have private insurance for students from the age of 28 to be able to visit work or industry outside the university

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
9. Design climatization objects, lifts, security systems and surveillance, domotic installations and network of communication and information.
10. Define the characteristics of the sismic action and apply the present regulations to the sismic calculation of structures in building construction.
CE1. Capacity of innovation: identify the reasons and the mechanisms of the technologic and technical changes.

Generical:
6. Provide to the student the capacity to apply the knowledge acquired in the resolution of complex problems in any sector of the building construction.
7. Analyse, evaluate and synthesise critically, new and difficult ideas of promotion, in academic and professional contexts, cientific advances, technologics, socials or culturals in the society of knowledge.

Transversal:
8. ENTREPRENEURSHIP AND INNOVATION: Knowing about and understanding how businesses are run and the sciences that govern their activity. Having the ability to understand labor laws and how planning, industrial and marketing strategies, quality and profits relate to each other.
11. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.

Basic:
2. Possess and understand knowledge which provide a basis or opportunity to be original in the development and/or application of ideas, usually in a context of research.
3. The students must be able to apply the acquired knowledges and their ability of resolution of problems in new or little known environments inside more wide environments (or multidisciplinary) related with their study field.
4. The students must be able to integrate knowledges and front to the complexity to formulate opinions from an information which, being incomplete or limited, includes reflections about the social and ethical responsabilities linked to the application of their knowledges and opinions.
5. The students must be able to communicate their conclusions and the knowledges and ultimate reasons which support to specialised and non-specialised audiences in a clear mode and without ambiguities.
1. The students must possess the learning abilities which allow them to continue studying in a way which should be to a large extent self-directed and autonomous.

TEACHING METHODOLOGY

There will be combined the in-person, directed and autonomous methods. With the combination of the three methods the student must achieve the levels of knowledge, comprehension, analytical and critical ability and its application on specific cases.

In the in-person method there will be special attention in the aspects of clarity, accuracy and exposition order, by the faculty. They will be done with the totality of the group. The professor will develop the topics of the course at class. The students will be given the necessary documentation in ATENEA so that they can follow better the class. The students can participate and argue, in scheduled temporary spaces, about aspects of the developed topic.

There will be done a guided individual work where there will be applied methods and concepts of work typical of a thesis.

LEARNING OBJECTIVES OF THE SUBJECT

Knowledge of the scope of the technologic progresses in the construction field and ability of their application.
Qualification to make audits of projects and master plans.
Ability to transmit knowledges and experiences to the coworkers. Ability in leadership.
Consciousness of the responsibility which fall on the building engineers about aspects of sustainability and respect for the environment.

STUDY LOAD

Type	Hours	Percentage
Hours large group	15,0	12.00
Hours small group	5,0	4.00
Hours medium group	5,0	4.00
Guided activities	10,0	8.00
Self study	90,0	72.00

Total learning time: 125 h

CONTENTS

T1 - BASIC PRINCIPLES OF THE CIRCULAR ECONOMY. TECHNIQUES AND CLASSIFICATION OF INDUSTRIALIZED SYSTEMS

Description:
We must incorporate the concept of circular economy into all our activities. Industrialization processes in construction can help to respond to this concept.
Classification of industrialized techniques and products for a prefabricated construction. Amorphous and shaped, Small elements and large shaped, Semiproducts and components
Analysis of the industrialized project through the concept of Circularity

Specific objectives:
Knowledge of New Industrialized Techniques Applied to Construction applied to the structure and envelope of projects.
Ability to analyze the building models with the greatest incidence in the field of construction facilitates the understanding of the multiple interactions that occur throughout the design-execution process.
Learn the past construction systems (homogeneous) to understand the evolution towards the current heterogeneous systems.
Acquire your own intellectual tools and develop objective and analytical criteria to select and evolve current industrialized systems
Learn the project strategies that allow minimizing the environmental impacts of the construction of architecture, applying concepts of circularity in the closure of material flows.

Related activities:
Introduction to group work

Full-or-part-time: 13h
Theory classes: 10h
Guided activities: 1h
Self study : 2h

T2 - INDUSTRIALIZED TECHNIQUES. Linear components. Production and Execution

Description:
Analysis of the industrial production system of linear components. Building construction processes with linear components
Systems based on LINEAR Components
Concrete-based industrialization techniques
Wood-based industrialization techniques
Steel-based industrialization techniques
Alternative industrialization techniques to the main ones

Specific objectives:
Know the techniques of industrial production according to materials to understand the constructive and architectural possibilities of building with these components

Related activities:
Introduction to group work

Full-or-part-time: 13h
Theory classes: 10h
Guided activities: 1h
Self study : 2h

T3 - INDUSTRIALIZED TECHNIQUES. TWO-DIMENSIONAL components. Production and Execution

Description:
Analysis of the industrial production system of two-dimensional components. Construction processes of buildings with two-dimensional components
Systems based on TWO-DIMENSIONAL Components
Industrialization techniques based on concrete
Wood-based industrialization techniques
Steel-based industrialization techniques
Alternative industrialization techniques to the main ones

Specific objectives:
Know the techniques of industrial production according to materials to understand the constructive and architectural possibilities of building with these components

Full-or-part-time: 13h
Theory classes: 10h
Guided activities: 1h
Self study : 2h

T4 - INDUSTRIALIZED TECHNIQUES. THREE DIMENSIONAL components. Production and Execution

Description:
Analysis of the industrial production system of 3D components. Building construction processes with 3D components
Systems based on THREE-DIMENSIONAL Components
Industrialization techniques based on concrete
Wood-based industrialization techniques
Steel-based industrialization techniques
Alternative industrialization techniques to the main ones

Specific objectives:
Know the techniques of industrial production according to materials to understand the constructive and architectural possibilities of building with these components

Full-or-part-time: 13h
Theory classes: 10h
Guided activities: 1h
Self study : 2h

ACTIVITIES

A-1 DEBATES

Description:
During the session, if necessary, the professor will question the students about prominence aspects appeared during the class with the purpose of facilitate the debate and the involvement of the class group.

Specific objectives:
Facilitate the comprehension of the apects explained during the session.
Improve the public expression ability of the students.

Material:
The debate deals with, essentially, the graphical and photographic content of the sessions.

Delivery:
There are no deliveries in this activity.

Full-or-part-time: 2h
Theory classes: 2h

A-2 TRABAJO DE LIBRE ELECCIÓN SOBRE ASPECTOS TRATADOS EN EL CURSO.

Description:
Each student will reach an agreement individually with the professor, choosing a topic and a development scheme during the first three weeks of the course. There are important the formal aspects, structure, quotes, graphical and photographic documentation, bibliography and conclusions.
The topic work's will be in relation to some constructive technology developed during the course with the aim of deepening its knowledge, detecting possible improvements and proposing them in the line of what could become an invention patent or a scientific article . The following structure is proposed for the work:

TITLE
subtitle
Goal
hypothesis
State of the Art (>20 cases)
Analysis and Taxonomy
Conclusions
development
proposal

Specific objectives:
Consolidate the knowledges acquired.
Increase the knowledge of the students on specific topics of their interest.
Help to structurate the expositions to deal with works of major magnitude.

Material:
Notes, bibliographic references and real case studies

Delivery:
At the end of the school calendar, in the date previously agreed.

Full-or-part-time: 36h 40m
Self study: 36h 40m

GRADING SYSTEM

CONTINUOUS ASSESSMENT.
The course evaluation will be carried out through 3 works related to the evolution of the course contents.
The first job will weight a 25% of the total, the second 30% and the third 45% of the final grade.
FINAL GRADE = Work 1 = 33% + Work 2 = 33% + Work 3 = 33%. Pass grade 5 or higher.

EXAMINATION RULES.

If some of the continous evaluation activities is not done, it will be considered with a mark of 0.
The problems derived from the evaluations or the justified impossibility of attendance to a test will be solved, firstly, between the professor and the student.

BIBLIOGRAPHY

Basic:
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- Deplazes, Andrea. Constructing architecture : materials, processes, structures : a handbook. Basel [etc.]: Birkhäuser, cop. 2005. ISBN 3764371897.
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- Rice, Peter. An Engineer imagines. London: Batsford, [2017]. ISBN 9781849944236.
- París Viviana, Oriol. Un Material per imaginar : innovació i singularitat en les façanes de formigó d'Escofet. Barcelona: Escofet 1886, S.A, 2023. ISBN 9788409500321.
- Fachadas ligeras, manual de producto. Nueva edición actualizada. Molins de Rei (Barcelona): Interempresas Media, marzo 2022. ISBN 9788412451016.

Complementary:
- Kottas, Dimitris. Vidrio: arquitectura y construcción. Barcelona: Links, 2012. ISBN 978-84-1512-385-9.
- Concrete: design, construction, examples. Basel: Munich: Birkhäuser; Detail, cop. 2006. ISBN 978-37-6437-631-4.
- La Construcción con madera laminada: manual técnico. Pamplona: Paul Gauthier, 2003. ISBN 846-07-7079-6.
- Forster, Brian; Mollaert, Marijke. Arquitectura textil: guía europea de diseño de las estructuras superficiales tensadas. Madrid: Munilla-Lería, 2009. ISBN 978-84-8915-082-9.
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