



Course guide

310767 - 310767 - Fundamentals of Lean Construction and Circular Economy

Last modified: 06/06/2024

Unit in charge:	Barcelona School of Building Construction	
Teaching unit:	758 - EPC - Department of Project and Construction Engineering.	
Degree:	BACHELOR'S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2019). (Optional subject).	
Academic year: 2024	ECTS Credits: 3.0	Languages: Catalan, English

LECTURER

Coordinating lecturer: Forcada Matheu, Nuria

Others: Judez Muñoz, Pedro

PRIOR SKILLS

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REQUIREMENTS

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TEACHING METHODOLOGY

The teaching methodology is divided into three parts:

- Face-to-face for content presentation.
- Face-to-face for practical work (exercises and problems).
- Autonomous work.

In the content presentation sessions, the lecturer will present the theoretical bases of the subject, concepts, methods and illustrative results with examples to facilitate general understanding.

In the face-to-face practical work sessions, the lecturer will guide the student in the application of the theoretical concepts for problem solving, promoting at all times critical reasoning. Students will have to solve exercises during the face-to-face sessions and at home.

Students, must work autonomously the material provided by the lecturer and the result of the work-problem sessions to assimilate and fix the concepts. The lecturers will provide a study plan and follow-up of activities (through Atena).

LEARNING OBJECTIVES OF THE SUBJECT

The management of processes in construction projects has undergone a great improvement in the last 20 years, adapting and implementing the discoveries made throughout the s. XX in the goods production industries. These improvements have been developed in the Anglo-Saxon countries, and are still scarcely known, and applied, in the Mediterranean countries.

The increasing use of BIM tools highlights the need and urgency to modify the paradigms underlying project contracting and management, especially those that separate Construction to Design.

This course introduces and presents some of these alternative paradigms, specifically: Theory of Constraints, Critical Chain, Last Planner System, Location Based Management System, Takt Time Planning, Lean Construction, Target Value Design, Lean Integrated Project Delivery and Choosing by Advantages.

The objective of the course is to show students a horizon of hope in which it is possible to improve in a very significant and radical way the current process management in construction works, and to encourage them to become factors of change in their projects and companies.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	40.00
Self study	45,0	60.00

Total learning time: 75 h

CONTENTS

Module 1: Current situation of the building construction industry

Description:

This module addresses how the building construction industry is currently organized, and some of its basic aspects: project life cycle, business models, possible project development models, type of construction companies, processes and phases in a construction project; and the role of the main stakeholders, from the client's business plan to the delivery and commissioning of the building.

Full-or-part-time: 15h

Theory classes: 6h

Practical classes: 9h

Module 2: Improvements in planning and control of activities on site

Description:

The traditional way of planning and controlling on-site activities is presented, using the paradigms based on Gantt and PERT charts and the underlying CPM theory; and they are compared with recent developments that emphasize the stable flow of production: Theory of Constraints TOC and Critical Chain Method CCM; Last Planner System LPS; Location Based Management System and Takt Time Planning.

Full-or-part-time: 14h

Theory classes: 8h

Practical classes: 6h

Module 3: Improvements in collaboration between Designers and Contractors

Description:

The most common way today is presented, to separate the Design activities from the Construction activities, and the inherent limitations of this model; and they are compared with integrated project development systems: Value Proposition, Conditions of Satisfaction, Learning to see Waste, Lean Integrated Project Delivery and Target Value Design.

Full-or-part-time: 20h

Theory classes: 8h

Practical classes: 12h

Module 4. Improvements in the way of hiring the actors

Description:

The most usual way of contracting the projects by the Property, its limitations and alternatives are presented, based on the alignment of interests, trust and collaboration: Formation of high-performance teams, Transparency and open-books; Selection of Actors; Early Builder Hiring, Team Building, Leadership and Respect for People, Shared Risk and Savings Pool.

Full-or-part-time: 20h

Theory classes: 8h

Practical classes: 12h

GRADING SYSTEM

The final grade depends on the following three elements:

- 35%, block 1 activities in class
- 35%, block 2 activities in class
- 30%, group work

EXAMINATION RULES.

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BIBLIOGRAPHY

Basic:

- Seed, W. Transforming Design and Construction: A Framework for Change. Lean Construction Institute, 1019.

Complementary:

- Forbes, Lincoln H. . Modern construction: Lean Project Delivery and Integrated Practices. Taylor and Francis, 2011.
- Eliyahu M. Goldratt. "Standing on the shoulders of giants: production concepts versus production applications. The Hitachi Tool Engineering example". Gestão & Produção [on line]. Available on: https://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-530X2009000300002&lng=en&tlng=en.- Willis, C. . Building the Empire State. WW Norton & Co, 2007.