



**Education for zero
energy Buildings using
Building Information
Modelling**

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Learning Unit 3



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NZEB REALIZATION AND COMMISSIONING: BUILDING ENVELOPE AND AIR TIGHTNESS

EQF	6	Target	Project manager Consultant Designer Construction manager Specialist in green building
Description			

The following learning unit is aimed at the creation of BIM objects suitable for nZEB design and their correct use within the BIM model. Therefore, principles and parameters affecting building envelope and air tightness, quality controls to guarantee nZEB values as well as best practices will be studied. All this with an active and innovative methodology, thanks to the digital tools that provide greater ease in the application of solutions in the design.

Objectives

- Use tools for BIM object creation (foundations, walls, roofs...)
- Understand the principles that affect an element to be suitable in an nZEB building design.
- Guarantee a correct nZEB design through the application of a quality control of the construction model.
- Base nZEB building design on suitable BIM objects.

Generic competence

- Advanced skills and good practices in the realization of nZEB buildings.
- Cognitive and practical skills to perform tasks related to the process of designing energy saving buildings.
- Advanced skills evaluating the influence of each parameter on the energy demand of the building.
- Spatial vision skills and knowledge of graphic representation techniques through computer-aided design applications.
- Knowledge of the design, analysis and construction of building works.



Specific competence

- Create BIM elements for nZEB design considering parameters such as transmittance and orientation.
- Recognise the impact of architectural design on sustainability and energy performance.
- Identify the interaction of building location, design, use and outdoor climate.
- Identify sustainable materials and the importance of its appropriate application.
- Recognise design methods for passive energy technologies.
- Assess systems related to building function and architecture.
- Select sustainable constructions technologies and materials.
- Knowledge on various installation materials, their performance, benefits versus costs.
- Recognise application of passive or active technologies.
- Design and engineer energy reduction systems to reach nZEB - in respect to building envelope.
- Design of an architectural sustainable building (including sustainable and flexible floorplan).
- Evaluate the integrated design.
- Evaluation and assessment of risks of mould formation and condensation.
- Select sustainable materials and technologies in nZEB design.
- Demonstrate the use of airtightness of building envelope.
- Design and engineer the airtight layer

Recommended learning methodology

Methodology



The recommended methodology for the course would be Gamification, is based on the application of elements of games (non-playful context), in order to influence the behaviour of people from the stimulation of their motivation.

In addition, another recommended methodology would be Design Thinking. A methodology that considers innovation as a holistic approach, where students through technology and their own interests or training needs converge through an action plan designed by themselves. It is based on finding the most original solution to a real problem given by the teacher, and for which the students will have to analyse the situation, establish hypotheses, and foresee possible impacts of the action.

Methods

The recommended methods will be based on individual work and the adaptation to Self-learning.

Recommended assessment methodology

The recommended evaluation will be the creation of a portfolio with the projects worked on during the course and the completion of written tests.
