



---

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

---

Grant Agreement: 600946-EPP-1-2018-1-IE-EPPKA2-KA

# **Learning Unit 4**



Co-funded by the  
Erasmus+ Programme  
of the European Union



## nZEB REALIZATION AND COMMISSIONING: BUILDING SERVICES AND SMART TECHNOLOGIES

<b>EQF</b>	6	<b>Target</b>	Project manager Consultant Designer Construction manager Specialist in green building
<b>Description</b>			

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 services and smart technologies, quality controls to guarantee nZEB values as well as best practices in the field 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 (energy systems, mechanical ventilation...).
- Identify 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.
- Perform analyse energy demand calculations for building services design.
- Compare and contrast different technologies to facilitate selection of an appropriate solution or solutions.

### 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 power, consumption and performance.
- Identify influence of heating and cooling generation on energy performance
- Apply specifics and basic parameters of heating and cooling
- Recognise different energy production systems in relation to energy performance
- Identify importance of energy reduction systems in relation to energy performance
- Recognise sustainable building technologies and appropriate application
- Identify the interaction between energy performance and IEQ
- Assess systems related to building function and architecture
- Investigate, determine and advise on energy reduction systems to reach nZEB
- Select sustainable constructions technologies and materials
- Identify performance, benefits and costs of various technologies
- Recognise application of active technologies
- Design and engineer energy reduction systems to reach nZEB
- Evaluate the integrated design
- Select sustainable materials and technologies in nZEB design
- Design and integration of smart measurement: types, data management, visualization in a BIM model.
- Design self-assessed and self-optimized systems.
- Definition of BEMS systems: requirements, principles, solutions
- Design and implement RES technologies, smart systems, automation and energy efficient lighting.

### 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.

---