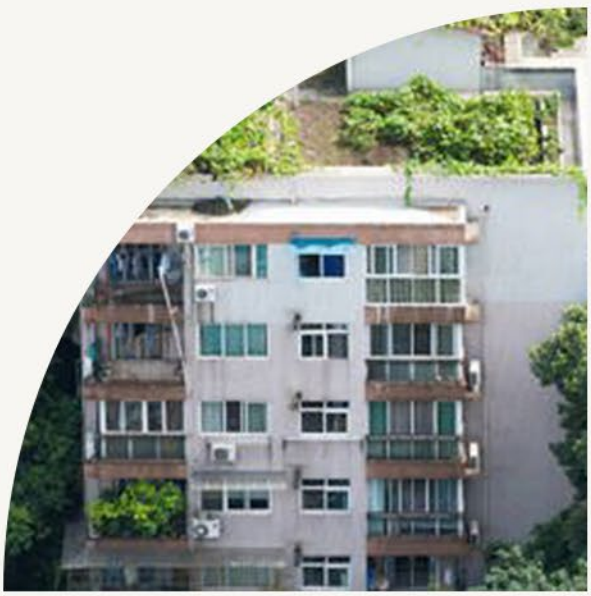
Course: Benefits, Installation, Maintenance, and Deconstruction of Green Roofs

Module 2. Installation of green roofs

Module Programme



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Nature Based Solutions: Green roofs training for urban and building sustainability Project

Key Action 2 | Call 2021

Cooperation partnerships in Vocational Education and Training

Project number:

2021-KA220-VET-7D7D053A

Partnership:

- Fundación Laboral de la Construcción (FLC). Spain
- Instituto de Robótica y Tecnologías de la Información y la Comunicación (IRTIC), adscrito a la Universidad de Valencia. Spain
- Pedmede Somateioe. Greece
- Scuola Edile Piacenza. Italy
- Laboratorio Nacional de Energia e Geología. Portugal

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Context

The NaturBuild Project is a initiative designed to address the evolving needs of the construction sector by integrating Nature-Based Solutions (NBS) into both urban and building environments. In line with the European Commission's definition, NBS are "solutions inspired and supported by nature, which are cost-effective, provide environmental, social, and economic benefits, and help build resilience." By incorporating natural processes and ecosystems into the built environment, NBS offer a sustainable approach to urban development, focusing on green infrastructure, such as green roofs, that can enhance energy efficiency, reduce CO2 emissions, and improve urban resilience.

NaturBuild is grounded in three key European policy pillars that guide its objectives and ensure its relevance within the EU context:

- The European Education Area: The project supports the green and digital transitions by investing in green education and training, closing the skills gap in vocational education and training (VET) for sustainable construction. NaturBuild contributes by creating new, innovative training materials that ensure construction workers have the skills needed to thrive in the green economy.
- The European Skills Agenda: This project aligns with the EU's vision for adapting VET curricula to meet the demands of the green and digital economy. The focus is on upskilling construction workers to fill gaps in expertise related to NBS, particularly in installation, maintenance, and deconstruction. By addressing these skills needs, NaturBuild plays a crucial role in ensuring the success of the European Green Deal's goals for a greener construction sector.
- The European Green Deal: One of the Deal's priorities is creating a sustainable and circular construction industry. NaturBuild addresses this by promoting NBS in construction, particularly green roofs, which have been proven to reduce environmental impacts while offering social, economic, and ecological benefits. The project also aligns with the Green Deal's Renovation Wave initiative, which aims to double the rate of building renovations to enhance energy efficiency and climate resilience.

Therefore, NaturBuild's main **objective** is to upskill construction workers with the skills necessary to meet market trends and support European sustainability goals. It focuses on:

- Developing and digitalising VET curricula specifically tailored to the demands of green construction, with a focus on NBS for buildings.
- Raising awareness among trainers, workers, and companies on the importance of NBS, contributing to more sustainable construction practices.
- Filling the existing skills gap in the sector, which has historically been underdeveloped in current VET pathways, especially at the blue-collar level.

The Partnership has developed a module-based course named Benefits, installation, maintenance and deconstruction of green roofs, integrated in the Moodle platform. The course has followed EQF methodlogy and follows EQAVET criteria, and as a whole it is equivalent to 3 ECVET credits.

Each module has followed the same work methodlogy, implemented in the following **tasks**:

- Documentary analysis to ensure a comprehensive understanding of the latest legislation, documentation, and practices at both EU and national levels.

- Definition of the skills perimeter
- Development of content, 2d and 3d activities, and a evaluation system.
- A Moodle design and integration of all the training resources developed.
- Digital pilot testing, where focus groups of researchers, trainers, and experts assess the developed training modules and digital platform for technical, technological, and pedagogical robustness.

This document addresses the Module 2 Programme, based on EQF criteria.

1. Skills perimeter. Learning outcomes description

QUALIFICATION TITLE	Installation, Maintenance and Deconstruction of green roofs- EQF LEVEL 3		
MODULE 2	Installation of green roofs		
LEARNING OUTCOMES	KNOWLEDGE	SKILLS	RESPONSIBILITY AND AUTONOMY
LO1 – To assimilate and recognize the risks and safety measures in installation of green roofs	To acknowledge the best practices and legal requirements in safety and healthy on construction site	To operate the safety and healthy best practices according to legal requirements on construction site.	To comply with safety and healthy best practices and legal requirements on construction site.
LO2- To assimilate and recognize the importance of Planning	To identify the main elements considered within the green roof planning typologies of green roofs, structural requirements, and material Specifications	To differentiate the typologies of green roofs, the structural requirements, and materials specifications	To recognise the different levels of supervision in a green roof construction To collaborate with the decision markers to ensure a proper planning. To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.
LO3 – To identify the construction requirements for green roofs.	To acknowledge terms of stability, singular elements, slip and erosion protection, and irrigation installation, within the design of the green-roof project	To distinguish the needs in terms of stability, singular elements, slip and erosion protection, and irrigation installation, within the design of the green-roof project	To recognise the different levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.
LO4 – To identify the construction requirements of vegetation areas	To acknowledge the design in terms of waterproofing membrane protective layer, drainage layer, filtering layer, substrate layer and vegetation layer, within the design of the green-roof project.	To recognise the steps and tasks to carry out the project in terms of waterproofing membrane protective layer, drainage layer, filtering layer, substrate layer and vegetation layer.	To collaborate with the different occupations and levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.

QUALIFICATION TITLE	Installation, Maintenance and Deconstruction of green roofs- EQF LEVEL 3		
LO5 – To assimilate and recognize and the compatibility with green roofs and solar systems	To acknowledge the terms of compatibility of green roofs and solar systems, within the green-roof project.	To recognise the steps and tasks to carry out the construction in terms of compatibility of green roofs and solar systems."	To collaborate with the different occupations and levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.
LO6 – To recognize the compatibility with green roofs and rainwater recovery and recycling, and with others non-green areas	To acknowledge the terms of the construction in terms of compatibility of green roofs and other non-green areas and rainwater recovery and recycling to improve water efficiency.	To recognise the steps and tasks to carry out the construction in terms of compatibility between green roofs and other non-green areas and rainwater recovery and recycling to improve water efficiency.	To collaborate with the different occupations and levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.
LO7 – To recognize the installation costs	To acknowledge the principles inherent of installation costs.	To operate taking into account the installation costs.	To recognise the different levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.

2. Module objectives

The objective of the entire course is to identify how to install, maintain and deconstruct green roofs, following the specified guidelines in the technical documentation and the orders of the supervisor, meeting the requirements in health and safety, quality, and environmental protection.

In Module 2. Installation of green roofs, the trainee will learn in this module :

- To assimilate and recognize the risks and safety measures in installation of green roofs
- To assimilate and recognize the importance of Planning
- To identify the construction requirements for green roofs.
- To identify the construction requirements of vegetation areas
- To assimilate and recognize and the compatibility with green roofs and solar systems
- To recognize the compatibility with green roofs and rainwater recovery and recycling, and with others non-green areas
- To recognize the installation costs

Target group

The module addresses specific content for general public interested in green roof works. However, it is focused to upskill roofers, gardeners, irrigation system installers, insulation worker and alike in works carried out in green roofs. Trainers are also a target group

3. Training content per unit training

Training unit Nº	Training unit title	Learning outcome related
1	Introduction and planning	LO2- To assimilate and recognize the importance of Planning
2	Construction Requirements for Green Roofs – new construction and rehabilitation	LO3 – To identify the construction requirements for green roofs.
3	Construction Requirements of vegetation areas - – new construction and rehabilitation	LO4 – To identify the construction requirements of vegetation areas
4	Compatibility with other technical systems and installation costs	LO5 – To assimilate and recognize and the compatibility with green roofs and solar systems LO6 – To recognize the compatibility with green roofs and rainwater recovery and recycling, and with others non-green areas LO7 – To recognize the installation costs

Learning Theory	Learning activities	Evaluation	TOTAL
22 hours	2 hours	1 hour	25 hours

UNIT 1	Introduction and Planning			
TIME	Theoretical Line	Practical Activities	Evaluation	TOTAL
	2,4 hours	0 hours	0,1 hours	2,5 hours
LEARNING OUTCOMES				
KNOWLEDGE	To identify the main elements considered within the green roof planning typologies of green roofs, structural requirements, and material specifications			
SKILLS	To differentiate the typologies of green roofs, the structural requirements, and materials specifications			
RESPONSIBILITY &AUTONOMY	To recognise the different levels of supervision in a green roof construction To collaborate with the decision markers to ensure a proper planning. To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.			

UNIT 2	Construction Requirements for Green Roofs – new construction and rehabilitation			
TIME	Theoretical Line	Practical Activities	Evaluation	TOTAL
	6 hours	0,7 hours	0,3 hours	7 hours
LEARNING OUTCOMES				
KNOWLEDGE	To acknowledge terms of stability, singular elements, slip and erosion protection, and irrigation installation, within the design of the green-roof project			
SKILLS	To distinguish the needs in terms of stability, singular elements, slip and erosion protection, and irrigation installation, within the design of the green-roof project			
RESPONSIBILITY &AUTONOMY	To recognise the different levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.			

UNIT 3	Construction Requirements of vegetation areas - – new construction and rehabilitation			
TIME	Theoretical Line	Practical Activities	Evaluation	TOTAL
	6,7 hours	1 hours	0,3 hours	8 hours
LEARNING OUTCOME				
KNOWLEDGE	To acknowledge the design in terms of waterproofing membrane protective layer, drainage layer, filtering layer, substrate layer and vegetation layer, within the design of the green-roof project.			
SKILLS	To recognise the steps and tasks to carry out the project in terms of waterproofing membrane protective layer, drainage layer, filtering layer, substrate layer and vegetation layer			
RESPONSIBILITY &AUTONOMY	To collaborate with the different occupations and levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To consider green economy approach in the tasks performed.			

UNIT 4	Compatibility with other technical systems and installation costs			
TIME	Theoretical Line	Practical Activities	Evaluation	TOTAL
	4,8 hours	0,5 hours	0,2 hours	5,5 hours
LEARNING OUTCOME				
KNOWLEDGE	To acknowledge the terms of compatibility of green roofs and solar systems, within the green-roof project. • To acknowledge the terms of the construction in terms of compatibility of green roofs and other non-green areas and rainwater recovery and recycling to improve water efficiency. • To acknowledge the principles inherent of installation costs			
SKILLS	To recognise the steps and tasks to carry out the construction in terms of compatibility of green roofs and solar systems. To recognise the steps and tasks to carry out the construction in terms of compatibility between green roofs and other non-green areas and rainwater recovery and recycling to improve water efficiency.			

	• To operate taking into account the installation costs.
RESPONSIBILITY &AUTONOMY	To collaborate with the different occupations and levels of supervision in a green roof construction To operate on the basis of occupational risk prevention measures. To recognise the different levels of supervision in a green roof construction To consider green economy approach in the tasks performed.

4. Methodology

This 8-hours module is fully online, and the trainee will find:

Reading content

- Module content: the trainee will have access to the module content through in two different ways:
  a) passing through the module, the arrows and the menu, structured in chapters.
  b) Downable file: training conten can also be printed by clicking this icon:
- More information: further information for any specific topic.
- Bibliography: resources used to develop the training content.
- Glossary: definition of terms used in the module.

Practical activities

The trainee could practice the new skills through two types of games:

- 2D games: they accompained to the training content, so they are only available in online modality.
- 3D game: it is a separated section where the trainee can choose different elements in different types of green roofs and check the benefits linked to the elements chosen.

Questionnaires

- Ex ante questionnaire: it does not score, it serves to register the skills level before starting the course.
- Quiz questionnaire: at the end of each chapter, a quizz with 5 questions will be opened.
- Final questionnaire: at the end of the course, and when all quizz questionnaires are done, a final questionnaire will be available.

Learning Theory	Learning activities	Evaluation	TOTAL
23’5 hours	0,5 hours	0,5 hour	25 hours

5. Module evaluation

The requirements to pass the Module 3 are:

- Chapter's quizz ➔ Compulsory. All chapters will end in a 5-questions survey, which it is compulsory to answering successfully all questions. There will be 4 attemps. Partners should define 10 questions per chapter and messages why an answer is not correct.
- Final questionnaire ➔ Compulsory. When all quizz are done, a final questionnaire will be available. It will have between 15-20 questions (3-5 questions per chapter). At least, 70% of questions should be correctly answered. 3 attempts.

EVALUATION ISSUES	COMPULSORY	REQUIREMENTS	SCORE
EXANTE QUESTIONNAIRE	YES	JUST TRY	PASSED
CHAPTER'S QUIZZ	YES	100%, 3 ATTEMPTS	
FINAL QUESTIONNAIRE	YES	AT LEAST, 70%	

6. Participation and communication

This a free course for interested in green roof installation, maintenance and deconstruction. This is available in English, Spanish, Portuguese, Italian and Greek.

For further information, please contact **internationalprojects@fundacionlaboral.org**


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