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GREEN ROOFS Technician Training Program

Work package n°4 - Guidelines for Green Roofs Training

A3. Guidelines development

June 1, 2025

Portuguese National Association of Green Roofs (ANCV)

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Introduction

The European Project “Green Roofs Technician Training Program ” (https://green-roofs.eu/) aims to develop innovative and multidisciplinary training aimed at qualifying Green Roof Technicians, professionals specialized in the design, evaluation, planning and implementation of solutions such as green roofs and urban agriculture in building rooftop environments.
This initiative comes at a time when urban challenges related to climate change, soil sealing, heat islands and biodiversity loss require specific action, integrated and sustainable responses. Nature-Based Solutions (NbS), such as green roofs, represent one of the most promising responses, as they combine environmental, social and economic benefits.
Technical training in this field is crucial because it prepares professionals capable of working across the sectors of architecture, engineering, urban planning, environmental management and community development. These professionals will be able to transform today's urban centers by implementing green infrastructures that will significantly contribute to the resilience of cities.
The course's pedagogical approach, combining theory, practice, case studies and participatory methodologies, promotes the acquisition of technical and socio-environmental skills, strengthening the employability of young graduates and the capacity of cities to respond resiliently to their challenges.
For all these reasons, the inclusion of Green Roof Training in Higher Education curricula should not be seen only as a didactic innovation, but as a fundamental strategy for the ecological transition, the promotion of the green economy and the construction of healthier, more inclusive and sustainable cities.

The Project Partners

The partners involved in the project were carefully selected based on their relevance, experience and commitment to the sectors of sustainable construction, environment, education and urban innovation. The diversity of institutional and geographical profiles allowed for a rich and complementary approach, with a truly European vision.
Each entity contributed uniquely to the development of the course:

_ **POLITECHNIKA ŚLĄSKA (SUT, Poland)** — Institution of excellence in the areas of engineering and technological innovation, with a strong focus on smart cities and sustainable solutions.

_**FALCO&ASSOCIATI (Falco, Italy)** — Institution specialized in innovation, sustainability and construction solutions. Responsible for methodological development and pedagogical coordination.

_ **GOSPODARSKA ZBORNICA SLOVENIJE (GZS, Slovenia)** — Institution with strong links to the business sector, facilitating the link between training and employability.

_ **KLAIPEDOS VALSTYBINE KOLEGIJA (KVK, Lithuania)** — Technical education institution

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with a focus on construction and engineering, supported the alignment between theory and practical market skills.

_ **EUROPEAN ASSOCIATION OF ERASMUS COORDINATORS (EAEC, Cyprus)** — Network of Erasmus coordinators promoting mobility, innovation and cooperation in European higher education. Contributed to the dissemination and validation of the course in multiple educational contexts.

_ **UNIVERSITATEA DUNAREA DE JOS DIN GALATI (UDJG, Romania)** — University with extensive academic and research experience, especially in the areas of engineering and sustainability.

_ **Portuguese National Association of Green Roofs (ANCV, Portugal)** — Non-profit environmental organization dedicated to promoting urban green infrastructure, bringing specialized technical knowledge and connection to the professional sector.

Executive Summary

These guidelines summarise the results and lessons learned from the pilot implementation of the training programme for green roof technicians, developed as part of the latest content work package (**Work Package 4).**

They aim to support **higher education institutions and training providers** in the following areas:

- Understanding what worked well and what can be improved in the delivery of green roof training;
- Integrating the course into formal or informal education pathways;
- Adapting the training to different regional, institutional and professional contexts.

The document offers **concrete recommendations** and presents **good practices** for flexible delivery, stakeholder involvement, practical learning and the long-term sustainability of the course. It is designed as a **practical reference** to improve the replicability and impact of green roof training across Europe.

Structure of the guidelines

The document is structured into the following sections:

- **Methodology**: how the pilot activities were carried out, including duration, participant profiles and evaluation tools.
- **Lessons learned**: feedback and reflections from learners, trainers and project partners on strengths and areas for improvement.
- **Highlights and recommendations**: suggestions for improving the content, delivery, usability and accessibility of the training.
- **Good practices**: examples of how to integrate green roof training into university programmes and effectively engage students.

These guidelines are intended for educators, curriculum designers, institutional leaders and stakeholders working in the field of sustainability, urban regeneration and green infrastructure. They can be read in full or used as a reference for specific sections depending on interest or needs.

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Methodology of Activities Implemented by Partner Institutions to Prepare the "WP4. A2. Pilot activities"

In order to evaluate the training materials and collect feedback for the development of the Guidelines, a pilot phase was organised within Work Package 4. This phase was crucial for testing the effectiveness, clarity and usability of the course components, including the training modules and the e-learning platform, and for gathering concrete suggestions for improvement. A pilot phase was necessary, involving all project partners. Seven groups were recruited by the partner institutions SUT, Falco, GZS, KVK, EAEC, UDJG and ANCV. Each partner recruited at least 20 participants, **totalling around 140 involved in the final testing phase**.
The methodology used followed a step-by-step guide for conducting pilot activities and producing guidelines. Evaluation questionnaires were applied to collect qualitative and quantitative data on the learning experience.
The pilot activities lasted a total of 40 hours, fully covering the course content.

Summary of Lessons Learned from Pilot Activities by all Partners

The pilot phase of the Green Roof project Technician, held in seven countries with the participation of professionals, experts in green roofs, educators and students, provided a rich database for the evaluation and improvement of the Green Roof training program. The activities were conducted in face-to-face, online and hybrid formats, ensuring methodological diversity and greater scope.
Overall, the program was widely valued for its multidisciplinary approach, which integrates technical, environmental and social aspects essential for the effective implementation of nature-based solutions in urban environments.

Participants gave a generally positive assessment, highlighting in particular the practical relevance of the content presented. The total satisfaction percentage among the 140 participants is approximately **85.71%**. Many emphasized that the support materials and assessment tools were essential for understanding the concepts and applying the knowledge in real-world contexts of green infrastructure development. The clarity and organization of the course facilitated assimilation, contributing to an effective and motivating learning experience.

The diversity of the groups that participated in the Pilot Activity, including trainers, landscape architects, entrepreneurs, students and experts in green roofs and vertical gardens, provided enriching and multifaceted feedback. This plurality of perspectives reinforced the perception that the course is suitable for different professional profiles. Participants expressed high satisfaction, **more than 80% satisfaction was achieved by participants**, with both the content and the teaching materials, revealing that professionals in the areas of architecture, urban planning and sustainability valued the

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multidisciplinary structure of the course, which combines ecological awareness, technical knowledge and social involvement.

Collective feedback confirms that the course meets the expectations of the different audiences involved, but also points to ways for it to become even more effective, accessible and adapted to regional and professional realities.

Highlights and Recommendations

The pilot process revealed not only high levels of satisfaction, but also challenges and opportunities for improvement that should be considered for the continuous evolution of the course. Participants suggested improvements in the quality of content presentation, in the refinement of technical language to make it more accessible to different profiles, and in the inclusion of new topics that broaden the scope, timeliness and applicability of the training. These observations reflect the commitment of those involved in improving the learning experience, reinforcing the potential of the course as a strategic tool for technical and environmental training:

_**Simplification and adaptation of content:** Although technical and scientific rigor is essential, it was found that the language and concepts needed to be made more accessible, especially for participants with diverse backgrounds and experiences. Clear communication is crucial to ensure that everyone can follow and fully benefit from the course.

_**Improvement of the digital platform:** The navigation experience on the Moodle platform, used for training, presented difficulties for some users, especially during the registration process and when accessing the materials. A more intuitive system will contribute to the engagement and continuity of participants.

_**Local contextualization:** The inclusion of practical examples and case studies adapted to regional realities was identified as a fundamental element in bringing theory closer to practice and increasing trainees' motivation. This facilitates the transfer of knowledge to real situations and stimulates applied innovation.

__**Greater interactivity:** The implementation of more dynamic pedagogical tools, such as interactive quizzes, explanatory videos, discussion forums and collaborative work, demonstrated greater active participation by students, promoting the exchange of experiences and reflective learning.

_**Flexibility and accessibility:** The course would benefit from a more flexible offering, which includes different teaching formats (in-person, online, hybrid) and which is available in multiple languages, facilitating adherence by a wider and more diverse audience.

_**Diversity of participants as a strong point:** The mix of instructors, students, professionals and experts in Nature-Based Solutions enriched the feedback on the course.

These lessons learned point to a clear path for improvement, focused on making the course not only technically sound, but also accessible, contextualized and engaging. Incorporating these improvements will strengthen the project's impact, encouraging the adoption of knowledge about Nature-Based Solutions in Higher Education and the job market, and supporting the transition towards greener, more inclusive and sustainable cities.

It is therefore essential to ensure clarity and simplicity in navigating the platform, especially given that some users have identified difficulties in using Moodle, particularly in the registration process and in accessing training materials. In addition, the integration of locally relevant case studies, the simplification of technical language without compromising the depth of the content, the reinforcement of the interactive component and the expansion of digital and linguistic accessibility are essential elements to strengthen the effectiveness of this training.

The adoption of these recommendations will allow for a more engaging, equitable learning experience that is aligned with the reality of participants, contributing to the course establishing itself as a solid reference in the panorama of education for urban sustainability in Higher Education.

Good Practices for Integrating Green Roof Training into Higher Education

The **"WP4. A2. Pilot" experience activities"** of the Green Roof Project Technician Training Program provided a valuable set of learnings that can guide the effective integration of the course into Higher Education.

Below, we highlight the main good practices identified to ensure pedagogical quality, practical relevance and accessibility of the program:

A. Format Flexibility and Accessibility

Offering training in different modalities, in person, online and hybrid, and in several languages, significantly expands its reach and inclusion. Flexibility allows training to be adapted to different institutional contexts and respond to the needs of different audiences.

→ Useful Tools

- Moodle: open-source platform to host and manage blended or online training.
- Edpuzzle: to turn video content into interactive lessons with quizzes.
- Canva for Education: for creating multilingual and visually accessible learning materials.

B. Diversity and Multidisciplinary

Encouraging the participation of different professional profiles and promoting interdisciplinary dialogue strengthens learning and reinforces the applicability of the course in the job market.

To maximize the impact of this proposal for integrating interdisciplinary dialogue and expert participation, it is essential that "Expert Conversation Cycles" be formally incorporated into the curriculum. In this way, interaction with experienced professionals ceases to be a one-off action and becomes a continuous and structured practice, ensuring that students have constant access to different perspectives and experiences in the professional field throughout their academic training.

Furthermore, the creation of "Thematic Days" or "Urban Sustainability Weeks" for students taking the online course, organized in partnership with external institutions, allows them to focus their efforts on specific topics of current relevance, encouraging an interdisciplinary and collaborative environment. These moments allow them not only to deepen the technical knowledge they are learning in the online course, but also to develop critical skills, debates and networking, increasing students' engagement with real and urgent issues in the sector.

→ Examples:

Environment Day with ANCV and Municipal Technicians - Sharing knowledge about Green Roofs.

C. Strategic Curricular Integration

An effective way to expand the reach of the *Green Roof course Technician* in Higher Education is to offer it as an extracurricular activity with credit for complementary hours. This approach is strategic for both students and institutions, as it responds to a common requirement of university curricula, the fulfilment of a minimum workload of complementary activities (or extracurricular activities), while providing practical, current training with high socio-environmental value.

D. Technical Visits and Case Studies

One of the most effective strategies to popularize the Green Roof online course Technician in Higher Education is the incorporation of on-site technical visits and case studies based on real green roof projects already implemented. This approach creates a valuable differential that attracts students interested not only in theoretical learning, but also in practical experience and direct contact with the professional field.

By offering the opportunity to participate in technical visits to real construction sites, the course provides a unique experience that connects the virtual learning environment with the physical world of sustainable urban solutions. This face-to-face interaction complements the online training, allowing students to closely observe the challenges faced, the techniques applied and the results achieved in different contexts.

In addition to enriching learning, this strategy has a strong motivational appeal, especially for students seeking a differentiated and applied education, with a direct impact on the job market. Access to case studies, with detailed analysis of green roof projects, stimulates critical thinking, problem-solving and creativity, essential skills for working in innovative sectors such as green roofs.

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→ Examples:

Technical Visits with Eramus+ Students (GREENROOFS Project - GREEN ROOF TRAINING PROGRAM)

E. Complementary In-Person Activities: Collaborative Projects and Talent Recognition to Enhance the Online Course

To increase the reach, appeal and impact of online courses in Higher Education, it is recommended to implement a hybrid dynamic that combines the flexibility of digital training with strategic face-to-face moments of interaction and practical application.

Immediately after registering for the course, students can participate in an initial classroom session, organized by the institution, with the aim of promoting the exchange of contacts, creating a group feeling and introducing the practical proposal that will be resumed at the end of the training.

After completing the online course and obtaining the certificate, students are invited to return in person to participate in a collaborative extracurricular activity, structured in a practical and creative challenge format.

The proposal includes:

_Formation of groups of 3 to 5 students, promoting collaboration and teamwork.

_Selecting an area with potential for implementing a green roof, located in the neighbourhood, city or country of the participants.

_Preparation of a technical justification explaining why the location was chosen, based on criteria such as strategic location, roof characteristics, environmental and social benefits, technical feasibility, among others.

_Development of a demonstration project, applying the knowledge acquired during the online course. The proposal may include materials, impact estimates, ideas for suitable vegetation and possible partnerships for implementation.

_Presentation of projects in a final seminar, in which each group defends its proposal in front of colleagues, teachers and invited professionals.

_Creation of a reward or recognition system for all projects presented, with mentions such as “Best Technical Justification”, “Project with Greatest Social and Environmental Impact”, “Most Innovative Proposal” or “Immediate Viability”. This reinforces the spirit of appreciation and merit, motivating students to become more deeply involved.

This initiative not only reinforces learning, but also transforms students into active agents of change in their communities.

→ Inspiration:

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F. Partnerships with Municipalities and Private Sectors

The proposal aims to create agreements between Higher Education Institutions, city governments and private sectors with the aim of encouraging the practical application of the knowledge acquired in the Green Roof Training course.

With this, students will be able to act as “disseminators of sustainable solutions”, presenting green roof projects directly to public bodies and municipal managers.

G. Communication Campaigns

The campaign may use multiple dissemination fronts:

- Institutions' social networks (Instagram, YouTube, TikTok, etc.), with short videos showing real works, environmental impacts and testimonials from former students;
- Newsletters and institutional emails, with visual calls to action and practical information on how to register or participate;
- Informational posters in high-traffic areas of Higher Education Institutions, such as cafeterias, hallways, libraries, auditoriums, and department bulletin boards.

H. Integration with Scientific Research Projects

The proposal consists of encouraging students, upon completing the course, to develop their own demonstrative green roof projects as a starting point for more in-depth investigations, guided by professors linked to the areas of sustainability, architecture, engineering, urban planning, biology or related areas.

To support this initiative, a repository of suggested topics could be created and updated annually, containing relevant subjects, guiding questions, and basic bibliographic references. This repository could be made available in partnership with the institution’s research centers, outreach units, and course coordinators.

Furthermore, the production of these works contributes to the generation of local scientific knowledge, strengthens the link between theory and practice, and creates a technical collection that can be shared with city halls, technical schools, environmental NGOs and companies interested in adopting nature-based solutions.

In the long term, this strategy can also foster permanent lines of research and extension on green roofs within institutions, expanding the scope and continuity of the project beyond the initial training.

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CONCLUSION

The pilot phase of the Green Roof Technician Training Program was a success, with activities carried out in seven countries and the active participation of professionals, experts, educators, and students. All stages of the program received positive evaluations, highlighting the practical relevance, clarity of the content, and the multidisciplinary approach of the training. The overall satisfaction rate reached approximately 85.71%, reflecting the course's effectiveness and its strong potential to promote nature-based solutions in urban contexts. The experience also revealed a valuable set of best practices for effectively implementing the course within Higher Education Institutions, such as offering flexible formats (in-person, online, and hybrid), making the course available in multiple languages, and integrating it as an extracurricular activity eligible for academic credit. Additionally, technical visits to real projects, collaborative in-person activities, and expert-led discussion cycles enrich the learning process and connect students to the professional field. Partnerships with municipalities and the private sector, along with the promotion of applied scientific research, further strengthen the link between theory and practice, positioning the course as a strategic tool for training future agents of sustainable urban transformation.

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