

GREEN SKILLS FOR CITIES

Short Term Programme Curriculum & Guidelines

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Institute for Advanced Architecture of Catalonia

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1. INTRODUCTION

1.1. DEVELOPING GREEN SKILLS FOR CITIES

There is growing recognition and awareness that nature can help provide viable solutions that use and deploy the properties of natural ecosystems services in order to address urban environmental, social and economic challenges. The European Commission (EC) defines nature-based solutions (NBS) as “Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions”. The EC has several objectives focusing on NBS, one of them being the advancement in “the development, uptake and upscale of innovative NBS”.

Cities are showing a growing interest in the integration of NBS to address urban challenges. Currently, NBS projects for cities are mainly developed by external entities specialised with the necessary knowledge to develop such complex projects, where experts from the fields of botany, technology, design and economy are required. In order to further strengthen the integration of NBS in cities, experts working in the public sector need to be empowered and trained with a transdisciplinary knowledge. In turn, this will help to: (1) introduce NBS projects in the cities with more efficient action plans and visions targeted at achieving the Sustainable Development Goals (SDG), especially SDG 13 Climate Action; (2) integrate NBS in urban and climate action plans; (3) develop new innovative NBS projects; and (4) receive, implement and manage NBS projects developed by external entities.

Green Skills for Cities (G4C) aims to establish a transdisciplinary educational platform aimed at the development of skills in the field of NBS implementation in cities. The project brings together teachers and learners from the fields of botany, technology, design, and economy involving them in an unique transdisciplinary learning environment aiming at the development of curricula targeted at working in the public sector and involves three educational institutions (Institute for Advanced Architecture of Catalonia, University of Genoa and Vienna University of Economics and Business) and one cities network (ALDA - European Association For Local Democracy).

G4C develops several activities, one of the main outcomes being setting up a “Short-term Programme” aimed at creating a transdisciplinary educational format to be implemented in the HEI’s. This report defines the main features and characteristics of the Short-term Programme Curricula.

1.2. INNOVATIVE ELEMENTS

Within the Short-term Programme several innovative educational strategies are implemented:

- **transdisciplinary approach to learning**

Students come from four disciplines (Botany, Technology, Design and Business) learning about each other's disciplines, in order to be able to cooperate with professionals with different backgrounds through theoretical and practical modules.

- **innovative learning strategies**

This will be achieved through the implementation of flip teaching, learning by doing and service learning.

- **a cross-border programme**

Learners will work in their respective cities simultaneously with learners in other cities. This creates the possibility for learners to interact and discuss ideas.

2. DEFINITION OF CV CHARACTERISTICS

2.1. OBJECTIVES

The curriculum will implement:

- **Service learning**
Enable the learners to become professionals able to work in municipalities and public bodies on urban sustainability enhancement through the implementation of NBS, a growing sector in the sustainable urban development field.
- **International cooperation**
Enable learners to learn to work in an international dimension preparing them for future cross border cooperation projects in which the municipalities and public bodies could be involved.

2.2. SKILLS GAP

From the surveys and interviews conducted by ALDA and the partners, several skills have been identified as missing or lacking. These include:

- Key knowledge on NBS
- Green infrastructure
- Lobbying, project development and management
- Tools and strategies for impact analysis
- Data analysis and data visualisation
- Communication with citizens
- Tools to engage citizens

- Transversal relationships between different disciplines
- Working with legislation for innovative ideas
- Cooperation and teamwork between disciplines

Through the course of this programme, these skills gaps will be addressed to help learners build a well-rounded knowledge base that could contribute to municipalities and public bodies.

2.3. SKILLS TO BE DEVELOPED

The learners have the opportunity to expand their skill sets within their discipline, but also in regards to the other disciplines. Learners will be expected to develop the following skills across all disciplines:

- To work in a cross-border manner taking into account different perspectives and feedback from different disciplines
- Clear communication in understandable way for citizens and non-experts
- Understanding legislation municipalities and public bodies face when implementing nature-based solutions

Below are a list of skills expected to be learned, by discipline:

Botany

The students will be able to:

- develop an overview of plants as a living and effective element of the green technological project within urban ecosystems;
- evaluate aspects related to the key role of plants in urban design and planning with particular reference to city resilience, environmental sustainability and climate change;
- recognize the main species characteristic of plants and their assemblages coherent with bioclimate of urban areas;

- develop the knowledge for the best practices to evaluate which plants use in Nature-based solutions interventions, referring to the ecological characteristics and the distribution of the species in the different terrestrial ecosystems within urban areas.

Technology Dimension

The students will be able to:

- consciously and critically analyse the issues of environmental sustainability applied to the NBS;
- argue the importance of the issues of resilience, optimization and circularity, applied to the architectural design and NBS;
- critically re-elaborate and evaluate the relationships between the urban environment, architectural and building envelope design and ecological and environmental issues;
- apply the acquired knowledge to the green design in architecture;
- qualitatively assess the impact and environmental benefits of design choices related to NBS, for example the selection of a design system or materials used for the construction of such systems, also considering the performance adjustment of the building envelope.

Design Dimension

The students will be able to:

- Implement and design NBS strategies that enhance and add value to the city while addressing key urban challenges;
- Conduct site analysis and impact analysis through digital simulation tools applied to a real case study;

- communicate and visualise their proposal in a clear and understandable way for both citizens and stakeholders to be able to process and understand the information.

Business Dimension

The students will be able to:

- form a business case for NBS solutions within the context of mitigation/adaptation for climate change, considering the barriers and opportunities of implementation;
- be able to identify and seize opportunities that may arise for key beneficiaries, through the development of presentation skills and negotiation skills;
- Promote stakeholder engagement and participation through strategies like surveys;
- Apply their knowledge to a project-based case study, and develop project and team management skills

2.4. FUTURE EMPLOYMENT PROSPECTS

One of the main goals is to provide the learners with the information and strategies to be able to work in the public sector implementing NBS. Some examples of future employers are:

- Municipalities
- Societies controlled by municipalities (as for example waste or water controlled companies)
- Provinces
- Regional bodies
- Ministries

The Short-term Programme will increase learners employability by:

- Strengthening their competitiveness in the labour market
- Facilitating access to the labour market within the public sector
- Providing the learner with a portfolio of solutions

3. COMMON CURRICULA

3.1. METHODOLOGY

The methodology for G4C is developed through Flip Teaching and Learning by Doing. Flip teaching will be used for the theoretical modules, where the students will be asked to learn the material before participating in classes to address doubts. The practical module will focus on learning by doing through project-based learning, giving the students real case studies to analyse and design solutions for.

The Short-term Programme methodology includes:

- **Urban challenges**
 - Heat Island Effect - this is a common challenge identified across the participating cities.

- **Theoretical modules**

The learners are provided with resources that they will study in advance. They participate in online and presential sessions to clarify any doubts. Each discipline provides a session for cross-border learning.

- **Practical exercise**

Learners will work in small groups, within their city, to address a common urban challenge amongst all participating cities. They will be asked to present proposals to the local stakeholders.

- **Interaction with stakeholders**

Stakeholders are asked to participate in giving an overview of the site and to be present in the final presentations of the learners. Where possible, stakeholders will be asked to participate in feedback sessions.

3.2. COURSE STRUCTURE

The course will be divided into two sections. Firstly, the theoretical part is taught through flip teaching methodologies and online sessions. This will be then followed by a practical module where the local learners work together on a real case study addressing the Urban Challenges highlighted in the surveys. This can be a common challenge across the participating cities to allow cross-border discussion.

Overall Calendar

Month	Description
Theoretical module	
Day 1	<ul style="list-style-type: none"> • Flip Teaching & Online Sessions • 1hr discussion sessions for each participating city with the tutors of each discipline
Day 2	<ul style="list-style-type: none"> • Flip Teaching • Introductory Online Session to the Practical Phase e.g a site visit with the municipality • Group division- 2 to 3 members per group
Practical module	
Day 3	<ul style="list-style-type: none"> • Project development session <ul style="list-style-type: none"> ◦ Define project objectives ◦ First draft of proposal • 1hr feedback & discussion sessions for each participating city with the tutors of each discipline
Day 4	<ul style="list-style-type: none"> • Project development session <ul style="list-style-type: none"> ◦ Finalisation of idea ◦ Creating content to present the idea to stakeholders • 1hr feedback & discussion sessions for each participating

	city with the tutors of each discipline
Day 5	<ul style="list-style-type: none"> • Finalisation of presentation and any prototypes • 30 minute feedback & discussion sessions for each participating city with the tutors of each discipline
	<ul style="list-style-type: none"> • Final presentation to participating cities and local municipalities

Theoretical Module

The learners are expected to have gone through the resources before the short-term programme. During the first two days, concepts and topics can be clarified through online sessions with trainers of the participating cities.

students learn the material provided in the resources themselves before participating presentially or in online classes to clarify the material and address their doubts. Each discipline will host an online session where the students from other disciplines can connect to ask questions and solve doubts.

Theory Module Outputs Required:

- Student Self Assessment Questionnaires

Practical - Project-based Learning

The practical part of the programme will include three intense days where learners will be asked to develop proposals from the different discipline perspectives. The proposal will tackle a common theme across all the participating cities, but the learners will focus on the city they are located in.

Practical Module Outputs Required:

- A Pitch/Presentation

3.3. STUDENT SELECTION PROCESS

Learners will be asked to register for the programme using an online form. They will be asked to apply giving their information (inc. name, affiliation, city they want to join, experience) and asked to write a short motivation for their interest in the programme.

4. GUIDELINES FOR COURSE IMPLEMENTATION

4.1. COOPERATION MECHANISMS BETWEEN INSTITUTIONS

- **Theoretical Classes**

Materials will be prepared beforehand and will be given in advance to the learners. Trainers should, if necessary, provide additional guidelines for the trainers of other disciplines on how to use their material or highlight important points.

- **Conflict prevention and resolution**

All transdisciplinary sessions will be agreed before the course to avoid any potential issues. If an issue should arise, the partner should raise it with all partners to find a viable solution.

4.2. COOPERATION MECHANISMS BETWEEN LEARNERS

- **Balance of groups**

The practical part of the courses is based on project-based learning and cooperative learning: the students will be organised into groups in their location based on interests, experience and knowledge

- **Common practical project development**

The learners work together in groups in their chosen location to develop solutions for a common urban challenge. At the end of the week the learners will present their solutions from the different discipline perspectives.

- **Meetings and Support**

1 hour review sessions per city will be organised to facilitate cross-border learning. Trainers can be reached through SLACK.

- **Conflict prevention & resolution**

As the programme is only a week long, trainers in each city will be responsible for solving issues that arise and finding the appropriate solutions. If needed, they can seek advice from the other trainers.

4.3. RESOURCES AVAILABLE

The resources will be made available online, including the documentation of the projects developed by the students, thus allowing the replication of the programme from other institutions and the use of the materials from students not participating in the programme, but interested in learning more about the topic.

Resources will Include:

- Presentations
- Video Tutorials
- PDF's in the format of short reports
Case Studies / State of the Art Examples
- Questionnaires for Learners Self Evaluation

Dimension	Resource Content
Botany & Technology	<p>Botany</p> <ul style="list-style-type: none"> ● Ecological characteristics and distribution of the plant species in the different terrestrial environments with specific reference to urban areas; ● Role of plants in urban design and planning in response to climate change and city resilience;

- Characteristics (nursery material, quality) and performance (ecosystem services and disservices) of the plant component in Nature-based Solution;
- Human-plant interactions: aesthetics and perception of plant components in urban areas;
- Tools and strategies for the sustainable integration of plant component in the urban area;
- Adoption of NbS in European cities and worldwide: best practices.

Technology

- Tools and strategies for the integration of greenery in architecture considering the environmental sustainability;
- Role of Botany, Business, Design and Technology disciplines in implementing the NbS in the cities. “Which are the challenges of each discipline?”;
- What are the Nature-based Solutions, and how will they transform the urban environments and citizens’ lives:
 - Opportunities and barriers that cities face to implement NbS;
 - Beneficial aspects for citizens of the adoption of NbS;
 - Identification and composition of Nature-based solutions that match with climate urban challenges;
- Technologies for NbS implementation in cities.

Design	<ul style="list-style-type: none"> • Best practices and case studies for nature-based solutions within the city • Site analysis including ecological connectivity • Development of suitable NBS for specific sites (site-specific design), considering climatic conditions, and main environmental challenges, including working with morphologies and innovative materials • Data driven design aiding NBS implementation • Testing performances through digital prototyping and simulations
Economic	<ul style="list-style-type: none"> • NBS and climate action in business context • Introduction to core elements of business sustainability <ul style="list-style-type: none"> ◦ Financial sustainability (impact measurement) • Management skills (transdisciplinary problem solving on various levels) • Network and exchange with project partners and practitioners • Case studies • Possible extra content: <ul style="list-style-type: none"> ◦ EU Policies: E.g. European green deal, green infrastructure strategy, bioeconomy strategy, etc. ◦ Team building ◦ Business case of NbS

Templates to be provided to the learners to make the documentation coherent.

4.4. EVALUATION PROCEDURE

4.4.1. LEARNER EVALUATION PROCEDURE

Learners will be asked to produce a series of outputs during the week-long programme. These include:

- > Student Self Assessment Questionnaires
- > A Pitch
- > Presentation

Templates to be provided to the learners to make the documentation coherent.

4.4.2. OVERALL EVALUATION PROCEDURE - QUALITY SURVEYS

For the evaluation of the overall programme, the learners, stakeholders and municipalities involved will be asked to assess the quality of the programme. This will be organised and handled by ALDA.

FOR LEARNERS

A survey will be prepared and disseminated to the learners of the Programmes, who will be asked to evaluate all the aspects of the programme in which they have been enrolled. The analysis of the survey will generate an array of inputs that will be useful for the replication of the programme.

QUALITY SURVEY FOR STAKEHOLDERS

Two surveys are aimed at monitoring the quality of results produced by the Programme and at evaluating the projects produced by the learners. The results of these surveys will ensure that the elaborated programmes address the needs and requirements defined in the first phase of the project.