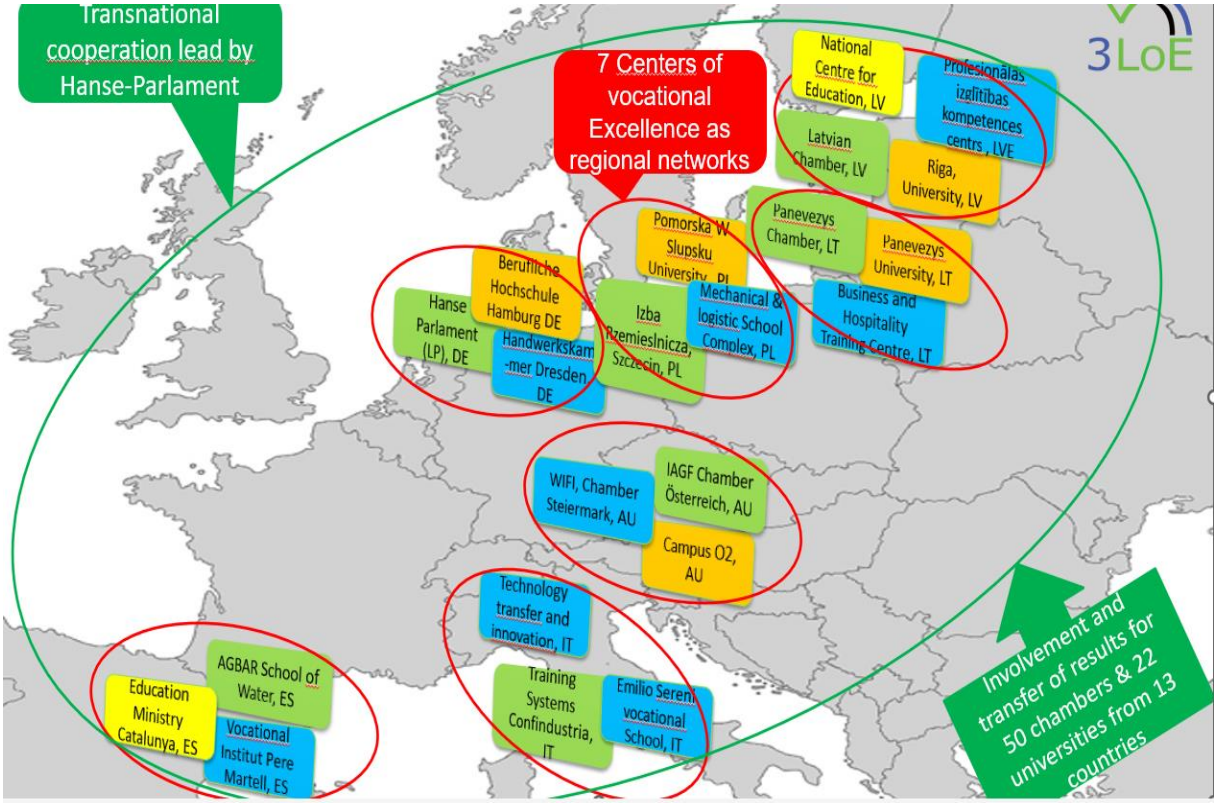
Result 4.10

Specific Trainings in the Green Economy

Partner



Language

English

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Summary of the Project and Introduction

1. About the 3LOE Project

Around 99% of all EU businesses are SMEs, creating up to 70% of all jobs. In general, SMEs have good growth prospects for the future and are particularly well equipped to solve environmental problems and to enhance the green economy. However, in most of the project countries, SMEs are confronted with a shortage of skilled workers and young entrepreneurs. This shortage of skilled workers is even more alarming taking into account that due to aging of current entrepreneurs, a large and growing number of companies will have to be handed over to the next generation. Furthermore, young specialists and entrepreneurs often lack the qualifications and skills needed in order to respond to contemporary developments in the fields of energy, climate and environmental protection. The following problems have been identified in SMEs working in the fields of green economy, energy and environmental protection:

- Blatant and growing shortage of skilled workers.
- Large qualification deficits, especially in the Green Economy.
- Loss of attractiveness and low qualification of school-based VET.
- Low rates of further training and insufficient orientation of offers to SME needs.
- Ageing of entrepreneurs and increasing shortage of young people (demographic change).
- Failure of business transfers and low rates of business start-ups.
- Low innovation rates and insufficient productivity.
- Not enough cooperation between universities and SMEs and a lack of teaching geared to SME needs.
- Comparably low internationalization of SMEs and vocational training providers.
- Lack of national level support for SMEs".

To meet these challenges, work-based learning and new paths in vocational training must be provided through cooperation between educational institutions, economic chambers and SMEs. University graduates are often well-qualified in theory, but lack practical knowledge, skills and abilities that are crucial for SMEs. For this reason, VET reforms must also involve higher education, and should implement dual bachelor's degree programs that combine a bachelor's degree with vocational training and on-sight work in companies.
In the 3LOE project, an innovative and complex project structure with 22 project partners from 7 countries as well as 60 associated partners from 13 countries was designed. In each country, centers of vocational excellence (COVEs) in Green Economy will be established, managed and their permanent continuation ensured. A transnational cooperation of the centers will be developed, extended to 60 education stakeholders from 13 countries and operated permanently in an institutionalized form. The centers will offer a wide range of dual education measures in vocational training, further education and higher education, that are being developed, tested and evaluated in the project. These educational measures on EQF levels 3-7 focus on Green Economy, Digitalization and Entrepreneurship. Furthermore, vocational and educational consulting and innovation support for SMEs will be developed and implemented. In total, seven Train-the-Trainer programs will be developed and implemented permanently by the project partners. All results will be transferred to the 60 associated partners together with implementation advice.

The objectives and aimed outcomes of the 3LOE project can be summarized as following:

1. Foundation of a three-level Center in each project country

1.1 Building the "Green Economy" skills alliance for qualifications in SMEs with educational and economic actors from the 7 project countries; development of information and cooperation tools.

1.2 Expansion of the skills alliance to the 60 associated partners from 13 countries, comprising chambers of commerce, SME associations, as well as universities of applied sciences/colleges.

1.3 Development, testing and evaluation of a curriculum and teaching materials for Train the Trainer courses for personnel and center management (vocational schoolteachers, trainers in SMEs and lecturers in further and higher education institutions).

1.4 Evaluation of the construction and operation of the seven centers of Excellence and of the transnational cooperation.

1.5 Development of business and financing plans and ensuring the long-term continuation of the seven centres and transnational cooperation.

1.6 Development, consulting and introduction of political strategy program.

2. Implementation and realization vocational training

2.1 Development and implementation of a tool for vocational and qualification counselling as well as a training for consultants and teachers to use the tool.

2.2 Implementation of the dual system, so that work-based learning is put into practice in the project countries.

Preparation and transfer of curricula and examination regulations for dual vocational training for different professions and implementations in Poland, Lithuania, Latvia and Spain.

Development, test and implementation Trainings for teachers to conduct dual vocational training as well as Training of trainers in SMEs.

2.3 Development political concept for the training and integration of young people with learning difficulties for young people with learning difficulties (EQF level 3).

Development, test and implementation of a dual vocational training "Specialist for Building Insulation”.

2.4 Development, testing and evaluation of education programme, teaching materials and examination regulations for the provision of sector-specific qualifications already during the initial vocational training for stronger learners. Implementation in the dual system, so that work-based learning is put into practice in the project countries.

2.5 Development and implementation five-year technician training „Ecologic Solutions in Logistics”.

3. Implementation and realization of further vocational training

3.1 Development and implementation of concepts and instruments for the management of continuing vocational training.

3.2 Development, test and implementation of a Train-the-Trainer program for teachers to conduct further training.

3.3 Development and implementation of a concept "SME-fair digitalization” as well as development, test and implementation of two train the trainer programs “Basic and advanced digital skills”.

3.4 Transfer and implementation of four further trainings Energy Saving and Renewable Energies.

3.5 Preparation, transfer and implementation of six further trainings in the Green Economy.

3.6 Development, testing and evaluation of different training programs and teaching material for owners, managers and qualified workers of SMEs (EQF level 5 and 6). The trainings are specifically tailored to SME needs and different qualification levels and combine the transfer of technical, professional and management know-how.
- Training Enterprise and Entrepreneurship in Green Economy
- Training Energy Service Manager
- Trainings vocational Master Carpenter and Electric
- Training Construction Technician
- Training Service Technician
- Training Sustainability in foodservice industry

3.7 Development of regulations for new continuing education occupational profiles with a focus on the green economy.
3.8 Development of an integration programme for the unemployed (EQF level 4) in order to be able to place the unemployed in permanent jobs through further training seminars and a further training qualification.

4. Implementation and realization of higher education

4.1 Preparation and transfer of curricula, evaluation and examination regulations for two existing dual Bachelor degree programmes "Management of Renewable Building Energy Technology" and "Business Administration for SMEs".
4.2 Development and beginning of implementation of new dual Bachelor degree programs
- Business Administration & Sustainable Management of SMEs
- Entrepreneurship and Innovation in Green Economy
- Logistics - Green Supply Chains
- Service technician
- Tutorial "Sustainable management Climate neutrality for companies"

4.3 Development, test and implementation of four study modules (EQF level 6) on SME management in the Green Economy sector, which will be carried out in the dual study system and integrated into existing Bachelor degree programmes.
4.4 Development and implementation of concept for innovation promotion Solutions for manageable R&D tasks of SMEs and conducting manageable R&D projects for SMEs-
4.5 Development, testing and implementation of Training program for university lecturers and SME advisors.

5. Dissemination, transfer and use of the project results

5.1 Development of a concept and summary evaluation of the dissemination results of all partners
5.2Transfer of all educational measures to 60 educational institutions in 13 countries and needs-oriented implementation consultations as well as realization of a bundle of measures for further dissemination of the project results.
5.3 Further dissemination activities such as presentations online, at third-party events, press releases and conferences.
5.4 Book with all results of the project and distribution via book trade.

For each of the three levels of educational measures there will be:

- Target-group-specific educational programs.
- Curricula, teaching materials, etc. developed in a leading role by the educational institutions of the respective level, whereby the educational institutions of the other levels (in particular universities) participate in an advisory and supportive manner.

- Representatives of the participant target groups involved in the development work.

All educational measures will be tested with the respective target groups under different national conditions in the countries, evaluated and completed on the basis of the evaluation results with application notes.
All results will be transferred to the 60 associated partners together with implementation advice.

2. About the Specific Trainings in the Green Economy

The outstanding goal of the 3LOE project is that the eight centres of vocational excellence founded in the course of the project dedicate themselves to qualifications in the green economy at a high-quality level. To achieve this goal, a large number of new vocational training measures will be developed at EQF level 3 - 7, practically tested under different national conditions, evaluated, revised on the basis of the evaluation results and finalized and implemented. However, existing educational measures that have proved particularly successful are also processed, transferred to all eight centres of vocational excellence and implemented by them.

In the first six months of the project, the priority needs and topics for further training measures were defined and discussed with all project partners and a comprehensive program of development and implementation work was agreed on this basis.

Once the COVEs had started their work, from the second year of the project onwards they increasingly received information and reports from public administrations, business and innovation promoters, educational institutions and companies on other urgent needs for additional further training measures for which there was a particularly high demand in the respective region. This related in particular to the following further vocational training measures.

- COVE Lithuania: Work-related English with Focus on Green Economy for Companies
- COVE Lithuania: Specific training for the hotel and catering industry in the green economy
- COVE Lithuania: Sustainability in foodservice industry
- COVE Lithuania: Waste management in food industry
- COVE Lithuania: Sustainable hotel practices
- COVE Italy: Industrial Symbiosis Facilitator
- COVE Italy: Green Public Procurement for SMEs
- COVE Austria: Basic knowledge of sustainability topics
- COVE Italy: Competences and innovation in the agricultural and food processing sector
- COVE Italy: Animal welfare for a better future
- COVE Italy: Use of drones in agriculture
- COVE Italy: Vertical farming
- COVE Italy: Techniques of organic farming

- COVE Poland: Further Training Electrician preparation for Technician

In order to meet these requirements for continuing vocational training, these measures were also included in the 3LOE project's work program from the third year of the project. The respective COVE developed curricula and teaching materials and carried out implementations with the support of partners from the other COVEs.

The completed educational programs were transferred to all other COVEs and implementation advice was provided. Some COVEs started implementing the programs during the project period.

Curricula and implementation experiences for the educational programs listed above are summarized below.

Work-related English with Focus on Green Economy for Companies[1]

1. Curriculum

1.1 Introduction

Objective and content of the curriculum:

In today's global economy most, companies have customers and partners in other countries or employ foreign specialists for temporary assignments. These workers are often experts in their field who can share their technical expertise, qualifications and experience. Unfortunately, much of this value can be lost if they are unable to communicate effectively in English with their work colleagues, teams, or clients.

The objective of this curriculum is to improve students' English language and communication skills for employability and workplace contexts.

Focus is given in workplace and green economy vocabulary, conversational practice is centered on relevant topics, and the mix of literacy skills practiced is tailored to the skills most necessary for the environment in the employee's current workplace.

During the course students will learn to apply English in real-life situations and in specialized fields. They will improve their linguistic competencies and develop speaking, listening, writing and reading skills of the upper-intermediate level of work-related English. At the end of the training the participants will be able to communicate more effectively to avoid misunderstandings and ineffective communications.

Target group

Entrepreneurs, managers and employees of different professions and activity sectors who need to use English in their day-to-day work and for whom using English would be essential for their career development.

Type of the course

Training course for further education.

Study form and methods

The form of studies is blended learning: group, pair and individual work including discussion forums, role-playing, watching and analyzing videos, listening and translation exercises.

Level

Intermediate to Advanced

The course is aimed at non-native English speakers who have studied English to at least intermediate level (appr. B1 on the CEFR). However, the content of the course can be adapted according to the language level of a particular student group.

[1] Prepared by Panevezys Chamber of Commerce, Industry and Crafts

Duration and group size

Course duration is 150 hours: 90 contact hours and 60 hours of individual learning.
In order to ensure the quality of the course, a maximum group size of 12 persons is aimed for, whereby a group size of 8-10 persons is regarded as optimal.

Assessment

- Entry test on arrival
- Continuous assessment via classwork and class assignments
- Mid-term progress test
- Final test

Grading and evaluating student work: midterm - 20 %, final test - 30%, class work - 50 %.

Document (certificate) issued upon completion of the course

The certificate of attendance is issued when the completion requirements are met, i.e., the learner has attended at least 50% of the contact hours and completed the final test.

1.2 Course Contents

The course focuses on key aspects of English for the workplace: grammar, vocabulary development, building group discussion, text production and presentation skills.

Course contents	***Learning objectives***	***Time guideline***
Grammar	Understanding and formulating statements, questions and demands worded positively and negatively;	40
	Identifying and reproducing actions, events and facts in present, past, future or timeless mode;	
	Identifying and establishing spatial, temporal and logical relationships	
	Understanding and formulating action perspectives (active and passive tense)	
	Identifying and describing the number, nature and affiliation of objects, living beings and facts	
	Direct/indirect speech	
	Formulating conditions and references	
Vocabulary	Developing profound vocabulary on green economy, waste management, sustainable development, etc.	40
	Technical job-related terms	
	Understanding further lexical units by listening or reading (receptive vocabulary) or by independently deriving from texts (potential vocabulary)	
Speaking	Making phone calls, taking messages	40
	Delivering a speech	
	Group discussions on given topics	

Pronunciation and intention	Knowledge of different pronunciation variants in the English language	10
	Mastering pronunciation to an extent to generally avoid misunderstandings, at word and at sentence level	
	Ability to translate characters of phonetic spelling into words	
Productions of texts and presentations	Business correspondence	20
	Meetings agenda and minutes	
	Surveys, data analyses and reports	
	Applying a writing technique	
	Preparing presentations	
		Total 150

Emphasis is given on key workplace expressions, technical terms and new vocabulary related to green economy. Group discussions on different topics when participants are asked to share their experiences, opinions, ideas and questions with other learners will help them to practice the new vocabulary and communication skills.

1.3 Suggested topics to cover

- Career development; searching and applying for jobs; preparing for and taking interviews. Searching for new employees.
- Starting new jobs and working with new colleagues; work environment and inner communication in the company.
- Market research, competitiveness, negotiating, presenting new products.
- Work safety rules, emergencies, technical problems at work.
- Customer service, marketing campaigns and sales techniques.
- Organizing and attending meetings. Organizing large international events.
- Relations with foreign partners, cultural differences, multicultural environment at work.
- Information technologies. Mass media, ethics and crime in the virtual world.
- Entrepreneurship and Leadership. Corporate social responsibility.
- What is a green economy and why is it important? How companies and organizations choose strategies that can help transitions from a linear to circular economy.
- Sustainable cities and communities: green transport systems; waste management; sustainable building.
- A changing climate for business: the impact and dependencies of climate change on society, the global economy and your business.

- The vision of a low carbon future: reimagining a more prosperous, low carbon world; examples of success stories in moving from a carbon-intensive to a low carbon economy.
- How can we minimize waste and pollution? Consumption habits. Zero waste idea. Reusing, recycling and upcycling.
- Pollution and climate change. Renewable energy sources and energy efficiency.
- Water resources, opportunities to reduce water usage, management of wastewater.
- Sustainable food (organic, fair trade and local products). Food Loss and food waste problem.

2. Implementation

Introduction

Period of implementation:
September 2021 – February 2024
It was conducted for several groups of participants.
The training is classified at EQF level 4 in the national system of continuing vocational training.

2.1 Admission and organization of the training

The curriculum was developed by Panevezys Chamber of Commerce, Industry and Crafts in spring 2021 with the aim to offer English language courses for people who need to use English in their workplaces.

Invitation to participate in the training was disseminated by emails, project newsletters and via Chamber website. Candidates willing to attend the training were given a language proficiency entry test so that to form groups of participants with similar level of English knowledge.

It was planned to form 5 groups (max. 12 participants in each) including business owners, managers and employees of the companies from various sectors of economic activity. In fact, 4 groups attended the training as group No. 3 asked for the training continuation (i.e. they had two training cycles from Pre-Intermediate to Intermediate and then Upper-Intermediate level of English). There were 6-9 participants in each group. Total number of participants: 31.

Implementation of the training was organized face-to-face as afternoon/evening classes.

The methods used included lectures, individual, pair and group work, discussions, listening tasks, role-playing, etc.

2.2 Participants profile and organization of the training

The target groups of the training were: entrepreneurs, managers and employees of different professions and activity sectors who need to use English in their day-to-day work and for whom using English would be essential for their career development.

Number of groups: 4
Number of trainings (cycles): 5
Total number of participants: 31
Execution of the training
The training was carried out according to the Curriculum "Work-related English with Focus on Green Economy" developed by Panevezys CCIC. Its objective was to improve students' English language and communication skills for employability and workplace contexts. The focus of the training was given to workplace and green economy vocabulary and conversational practice on relevant topics. During group discussions the participants were asked to share their experiences, opinions, ideas on different topics with other learners, this way they practiced the new vocabulary and improved their communication skills.
During the course students were taught to apply English in real-life situations and in specialized fields. They improved their linguistic competencies and developed speaking, listening, writing and reading skills of work-related English. They improved their ability to communicate more effectively to avoid misunderstandings and ineffective communications.
A digital certificate of attendance was issued to the learners who had attended at least 50% of the contact hours and completed the final assessment test.
Main Findings and Conclusions
The participants agreed that the overall content of the training course was very good, useful, relevant and the topics were not repetitive. They were happy with the professional course lecturer and the interactive teaching methods used. The majority of participants said they had gained new knowledge, improved their speaking, listening and other skills that would surely help them in their professional life. The most important advantage of the training was the improved self-confidence of the participants when communicating in English.
The participants were happy they had a possibility to discuss, exchange ideas and experiences with people from other companies.
The content of curriculum "Work-related English with Focus on Green Economy" is divided into parts with different learning aims and a list of the topics to be covered is given. When necessary, the training content and the duration of each part can be easily modified and adapted taking into account the participants' needs, previous experience and knowledge.
The training will be continuously used by Panevezys Chamber of Commerce, Industry and Crafts in the future for employees and managers of SMEs from various industrial sectors.

Specific training for the hotel and catering industry in the green economy[2]

Verslo ir svetingumo profesinės karjeros centras (VESK) is an accredited institution for the professional development of teachers and education support professionals in Lithuania (Accreditation Order No. IVP-43 of 19 January 2022) and has established an operating Centre for Competence Development. Its aim is to ensure the quality development, evaluation and implementation of professional development programs that meet the needs of teachers and learning support professionals, in accordance with the general education policy and the regulations on continuous learning adopted by the European Union.

In the framework of the 3LoE project, VESK organized a number of additional trainings for different target groups and issued certificates for the participants. The majority of the trainings were organized as one- or two-day courses as this form is the most suitable for teachers or SMEs workers who cannot leave their workplace for a longer period of time. All trainings consisted of a theoretical part that presented the topics of the Green Economy and a practical part allowing to apply certain sustainability practices. The total number of participants that attended the trainings was 158.

The list of the trainings organized by VESK:

No	Date	Title	No of Hours	Topics covered	Target group	No of Participants	Comments
1.	13.04.2023	**Zero Waste in Confectionery**	8	• Introduction to Sustainability • Sustainable Ingredients • Reducing Food Waste and Creative Use of Leftovers • Sustainable Production Practices • Practical part: Baking sustainably - Dough recipes, a range of bakery products and production technology, recipes for pastry fillings.	VET teachers and SMEs employees	15	This training aims to provide understanding of sustainability in the confectionery industry, covering ingredients, production practices, waste reduction, and empowering participants to make more sustainable

[2] Prepared by: Verslo ir svetingumo profesinės karjeros centras

							choices in their baking practices.
2.	February - April 2024	**Sustainability in Foodservice Industry**	20	• Impact of the foodservice industry on the environment • Principles of circular foodservice operation • Key principles of Zero-waste cooking: whole ingredient utilization; mindful meal planning and portion contol; creative repurposing; batch cooking; proper preservation and storage techniques; composting food waste, etc.	VET and technology teachers	21	The training was delivered in cooperation with Partner PP8 - Panevezys CCIC
3.	19.03.2024	**Dual training: the success story of Austria for over 100 years**	6	• How can we develop dual vocational education and training to make the academic learning pathway more attractive? • How to strengthen the image of apprenticeship learning? • What future exchanges are possible between Lithuania and Austria in vocational training?	VET managers and teachers	38	The training was delivered in cooperation with Partner PP13 - Wirtschaftskammer Osterreich (IAGF)
4.	19-20.03.2024	**Sustainability practices in pastry**	16	• Introduction to Sustainability in Pastry • Sustainable Ingredients • Reducing Food Waste	VET teachers and SMEs employees	30	The training was organized in cooperation with Partner PP13 -

				• Innovations and Trends in Sustainable Pastry • Practical part: Making traditional Austrian cakes and modern desserts in a sustainable manner			Wirtschaftskammer Osterreich (IAGF). The trainings were delivered by the pastry chefs of *Cafe Central* in Vienna, Veronika Schmidt, who has extensive pastry experience and won gold at the Vienna Cake master 2020 competition, and Ana Sauer, who was voted Europe's best pastry chef at the Euro skills competition in 2022.
5.	17.05.2024	**Sustainable textiles today**	8	• Introduction to Sustainable Textiles • Sustainable Materials and Fibers • Eco-Friendly Production Processes and Sustainable Techniques • Circular Economy in Textiles • Innovations and Trends in Sustainable Textiles	VET and technology teachers	24	This training aims to provide a comprehensive understanding of sustainable textiles, covering materials, processes, certifications, and innovations, and empowering participants to make more informed and sustainable choices in the textile industry.

6.	17.05.2024	**Sustainability when reading product labels**	8	• Introduction to Sustainability • Understanding Product Labels • Key Sustainability Indicators on Labels • Decoding Ingredient Lists • Practical Tips for Consumers • Case Studies and Examples	VET and technology teachers	30	The training covers various topics to educate participants on identifying and understanding sustainability-related information on product labels in order to make more sustainable choices.

Sustainability in foodservice industry[3]

1. Curriculum

1.1 Objective and content of the curriculum

The catering industry, like many other sectors, has its share of environmental challenges. From food waste and energy consumption to water use and disposable packaging, there are various ways in which catering can negatively impact the environment. Recognizing these challenges, many catering businesses are embracing eco-friendly practices and equipment to address these issues. The zero-waste strategy is one of their priorities.

The curriculum of this short training course was prepared on the basis of certain modules of the curriculum "Sustainable Restaurant Worker" developed by PMC Zirmunai.

This training aims to provide participants with knowledge and understanding about the impact of foodservice industry on the environment; the principles taken by the catering businesses to ensure their sustainable daily operation as well as practical examples how to implement such sustainable measures.

The focus of the training is on zero-waste cooking – a sustainable approach to preparing meals that minimizes food waste and maximizes the use of all food components. This culinary philosophy encourages not only to find innovative ways to use what is traditionally considered waste but also emphasizes the importance of sourcing sustainably grown and locally produced ingredients to reduce environmental footprints. Zero-waste cooking goes beyond simply reducing food waste and encompasses the entire process, from meal planning and ingredient selection to repurposing leftovers and composting.

After completion of the training the learners will be equipped with knowledge and practical skills how to integrate sustainable cooking practices in regular kitchen work or one 's daily life. They will know the principles of zero waste cooking and will be able to prepare and cook dishes with minimal waste.

The content of the curriculum can be flexibly adapted according to the level of knowledge and skills of the participants.

Target group

VET and technology teachers who teach subjects related to cooking and catering service; employees of foodservice establishments; anybody interested in the topic.

Type of the course

Training course for further education or additional qualification, its content is mainly suitable for EQF level 4.

Study form and methods

[3] Prepared by Panevezys Chamber of Commerce, Industry and Crafts

Methods: lecture, presentation, group discussion, analysis of best practice cases, hands-on practical workshop.

Duration

22 hours: 16 hours - theory, 6 hours - a practical workshop (optional).

Certificates

The certificate of attendance is issued if the learner has attended at least 70% of the contact hours. No formal assessment of competences is organized.

1.2 Course Contents

Module 1 - Environment and sustainability in foodservice industry

Content	Time guideline (hours)
Impact of the foodservice industry on the environment: Positive (creating employment and business opportunities contributing to the local economy, sustainable practices to promote a green image that appeals to customers: using local and organic products, recycling, using less chemicals, using energy and water efficient systems.) Negative (CO2 emissions, food waste, plastic waste, large use of energy, water and other resources, improper disposal of waste, noise, etc.) Growth of foodservice businesses: increasing customer numbers, comparison of carbon footprints of different equipment and products used in the industry, impact of customers' choices on the environment.	2

Module 2 - Principles of circular foodservice operation

Content	Time guideline (hours)
Field-to-table movement: local sourcing, direct acquisition from small producers, eco products, food traceability. Food ecology. Designing and marketing healthier food products. Eco-labeling.	2
Management and elimination of food waste: turning the remaining by-products into ingredients of new foods; composting. Management of non-food (packaging) waste: collection, sorting of cardboard, plastic and glass packaging, storage, utilization. 6 Rs – recycle, rethink, refuse, reuse, repair, reduce.	
The purpose and practice of sustainability in relation to the use of energy and equipment in a professional kitchen. Energy-efficient kitchen equipment. Planning kitchen layout to maximize efficiency. Monitoring energy use and setting targets for reduction.	

Module 3 - Key principles of Zero-waste cooking

	12
Mindful meal planning, menus and portion control	

Planning meals in advance, calculation of quantities. Purchasing and preparing only what is needed. Utilizing ingredients across multiple meals. Considering serving sizes. Principles of sustainable, healthy and balanced menu: fresh and seasonal products sourcing local and organic, sustainably grown food reducing amount of animal products, replacing them with plant-based or alternative proteins diversity: catering to different dietary needs and preferences focus on whole, minimally processed foods less added sugar and salt calorie quality over quantity, etc. Criteria for selecting certain meals (occasion, style and theme of the event, season, time of the day, dietary requirements of customers, etc.)	
Creative repurposing Finding creative ways to repurpose ingredients and leftovers (e.g. leftover rice transformed into fried rice or rice pudding; stale bread turned into breadcrumbs, croutons or bread pudding). Combining small amounts of different leftover ingredients to create composite meals. Preparation of traditional recipes in a creative and sustainable way.	
Batch cooking Preparing larger quantities of food and one-pot meals in order to save time, energy, and resources. Recipes. Kitchen tips for making one-pot meals: - Preparing ingredients beforehand (chop vegetables, measure ingredients, marinate the meat) - Choosing the right pot (use a wide, deep pot with a tight-fitting lid) - Layering ingredients strategically (start by cooking the ingredients that take the longest and then add the faster-cooking ingredients). - Using the right amount of liquid (use just enough liquid to cover the ingredients, and add more as needed) - Not to stir too much (one-pot meals depend on steam and liquid to evenly cook the ingredients; over-stirring can cause delicate ingredients to break apart) - Experimenting with different flavors (using different herbs, spices, and sauces to create unique and delicious meals)	
Preservation techniques and using natural resources Preservation techniques that extend the shelf life of ingredients, help to preserve leftovers for future use and reduce waste: pickling, fermenting, canning, freezing, drying. Storage conditions and risk evaluation. Using natural resources: recognizing and using edible wild herbs and other products in different dishes. Restaurant 's own vegetable garden.	
Proper storage techniques Food storage requirements for different foods to maintain freshness and prevent spoilage. „First in, first out" method (FIFO): using the oldest items before the newer ones helps prevent food from being forgotten and expiring.	
Composting Composting unavoidable inedible food scraps or waste that cannot be repurposed - organic matter breaks down naturally and can be used to enrich the soil for gardening or farming, completing the cycle of sustainability.	

Local regulations on composting organic waste.	

Module 4 - Practical workshop

Content	Time guideline (hours)
Selection of dishes, correct calculation of the needed amount of food products and raw materials. Preparation of dishes according to zero-waste principles, with the lowest consumption of products and energy resources. Finishing, decorating and serving the dishes. Review of the workshop results, group discussion.	6

2. Implementation

Period of implementation

February - April 2024

Admission and organization of the training

This short training was intended for employees of catering establishments, VET teachers and technology teachers of high schools as well as general public interested in the topic of zero-waste cooking. Invitations to participate in the training were sent by email to educational institutions of Lithuania, published on Panevezys CCIC website and in weekly newsletters.

The training was attended by 21 participants from various regions of the country - mostly VET and technology teachers who teach subjects related to cooking and catering service.

Participation in the training required at least basic competences and practical skills in food technologies.

Participants profile and organization of the training

Number of participants – 21.

Execution of the training

The training was implemented as a series of 4 weekly online seminars and one practical workshop.

Total duration of the training - 20 hours.

The topics covered during online seminars included the following:

- Impact of the foodservice industry on the environment
- Principles of circular foodservice operation
- Key principles of Zero-waste cooking: whole ingredient utilization; mindful meal planning and portion control; creative repurposing; batch cooking; proper preservation and storage techniques; composting food waste, etc.

The last stage of the training was a practical 6-hour workshop in VESK training centre Vilnius. First the recipes were discussed, then the participants were divided into small groups, and they prepared snacks, main dishes and desserts according to zero-waste principles, with the lowest consumption of products and energy resources. The dishes were decorated, served and tasted.

The workshop was conducted by an expert teacher. After an overview of the workshop results, the participants were taken for a short tour: VESK culinary and confectionary laboratories, sustainable restaurant kitchen, food waste composting utilities, etc.

All participants received certificates of attendance.

Main findings and conclusions

The participants stated that the overall content of the training course was very good and up to date. They received valuable practical tips and teaching material to be used during their own food technology lessons. All of them were satisfied with the practical workshop and an opportunity to visit modern training facilities, to exchange experience with other group members.

The participants stated they would like to attend more trainings on similar topics related to sustainability.

If needed, the training curriculum can be adapted to country-specific context and modified taking into account specific needs of the participants, their previous experience and skill level.

Waste management in food industry[4]

1. Curricula

1.1 Introduction

Objective and content of the curriculum

Food waste is becoming an increasingly important issue at both a local and global level, its impact is seen in many environmental, economic, and social aspects.

The greenhouse gas emissions from food production and consumption, as well as from its final disposal, depletion of natural resources and pollution are the most prominent environmental impacts associated with food waste. Food waste has also economic implications for everyone within the food supply chain, from the farmer to the food producer and the consumer.

Significant amounts of food waste are generated in different stages and sectors: primary production, processing and manufacturing, retail and distribution of food products, preparation and serving of food in commercial and domestic environments. Every year around one-third of global food production (appr. 1.3 billion tons) is lost or wasted and households are the biggest source of food waste in the EU.

While it may not be possible to completely eliminate food waste, the food industry can highly reduce it and contribute to a more sustainable and responsible food system. A significant amount of unnecessary loss can be avoided with better management systems throughout the food supply chain.

Food waste management refers to the systematic approach and the strategies implemented to handle and redirect food and agricultural products for better purposes such as human consumption, animal feed, industrial application, and other environmental benefits.

This training course aims to upskill participants with the knowledge and principles of management and reduction of food waste. It highlights the causes and ecological impact of food loss and waste, describes proper management of food waste and identifies main strategies for its prevention and reduction.

At the end of the course participants will be able to identify the main actors and hot spots for food loss and waste in different food chains; know the causes and consequences of food waste, principles of its management and strategies for reducing this waste. They will also get acquainted with the directives and regulations aimed at solving food waste problem.

Target group

The course is addressed to catering businesses, food producers, managers, specialists and general public working on or concerned with the implementation of measures to reduce food loss and waste.

Type of the course

[4] Prepared by Panevezys Chamber of Commerce, Industry and Crafts

Training course for further education or additional qualification, EQF level 4. The content of the curriculum can be flexibly adapted according to the level of knowledge and skills of the participants.

Study methods

Lecture, presentation, group discussion, analysis of best practice cases.

Duration

24 hours.

Certificates

The certificate of attendance is issued if the learner has attended at least 70% of the contact hours. No formal assessment of competences is organized.

1.2 Course Contents

- Causes and consequences of food waste
- Farm to Fork Strategy. EU and national policies to tackle food waste
- Management of food waste. Prevention and reduction strategies. Use of AI
- Methods to reduce wasted food in households and catering business
- Recycling and reuse of waste generated in food industry. Redistribution

Causes and consequences of food waste

	Time guide-line (hours)
Factors contributing to food waste: Overproduction Inadequate storage and handling practices Consumer behavior, insufficient shopping and meal planning Strict aesthetic standards, when visually imperfect food is discarded Inefficient food distribution systems, etc. Impacts: Environmental: resource depletion, greenhouse gas emissions, biodiversity impact Economic: financial losses, increased food prices, missed economic opportunities Social: food insecurity, malnutrition, ethical considerations, community engagement	2

Farm to Fork Strategy. EU and national policies to tackle food waste

	Time guide-line (hours)
Food loss vs. Food waste EU Farm to Fork Strategy - to minimise the distance and processes that food undergoes between its origin in the fields to the final consumer.	2

Challenges in balancing sustainable agricultural practices, as advocated by the Farm to Fork Strategy, with the economic realities faced by farmers. Waste framework directive – requirement for the EU member states to cut food waste by 10% in processing and manufacturing by 2030. EU and national guidelines on food donation. Ongoing and expected public and private initiatives to reduce food waste.	

Management of food waste. Prevention and reduction strategies. Use of AI

	Time guideline (hours)
Importance of effective waste management procedures in food factories and sales points to minimise the risk of contamination and ensure safety of the products. Identification where and why food gets lost in the system. Measuring food waste. Waste Management Hierarchy - the order of waste management options, from the most preferred to the least preferred one: 1. Prevention of waste at the source - the simplest, most preferable and often the least costly option. 2. Minimization, if waste generation cannot be completely prevented. 3. Reuse - repairing, refurbishing, or repurposing items to extend their lifespan. 4. Recycling - processing of waste materials to create new products or convert waste into raw materials for manufacturing. 5. Disposal or landfilling when none of the above methods could be used. Prevention and Reduction strategies: • Improving supply chain efficiency • Implementing sustainable packaging • Educating and empowering employees and consumers • Implementing food recovery programs • Implementing food waste tracking and monitoring systems • Encouraging collaboration and sharing best practices How can AI be used in food waste management: • Demand forecasting • Quality control • Shelf-life prediction • Supply chain optimization • Smart inventory management • Donation and redistribution • Consumer engagement	12

Methods to reduce wasted food in households and catering business

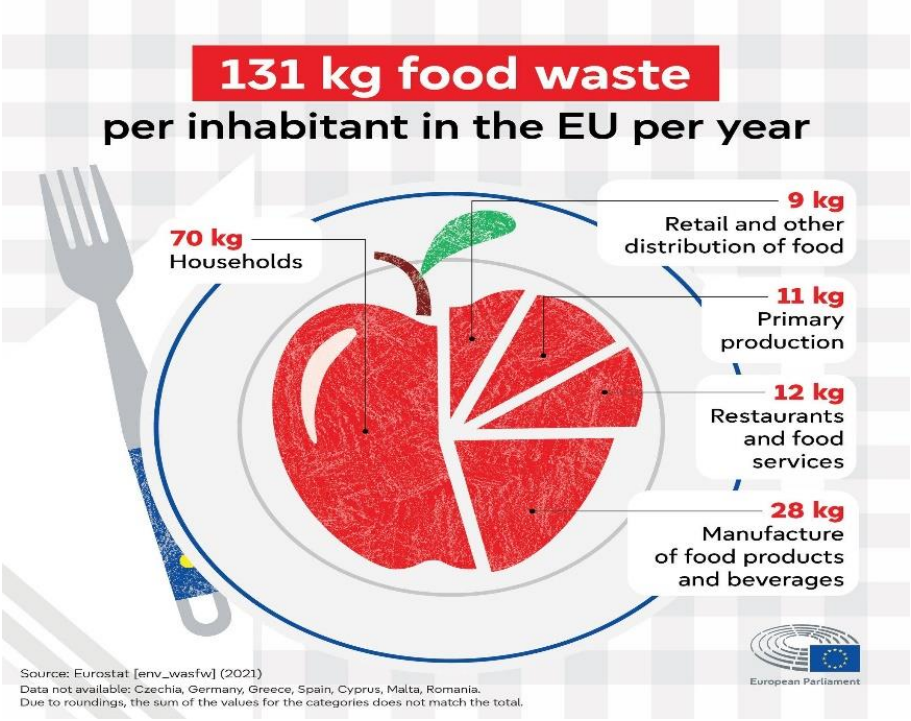
	Time guide-line (hours)
Ways to reduce food waste at home: - smart shopping (making a shopping list acc. to meal plan; buying only what is needed) - smart storage (tips to keep fruit and vegetables fresh, preservation techniques, checking expiration dates; „Firs in, first out" method) - smart preparation (using every edible part of ingredients; repurposing of leftovers; batch cooking; controlling portion sizes, etc.) - smart saving (eat what you buy), etc. Ways to reduce food waste in restaurant business: a) at the pre-service stage (kitchen level): better cooperation with suppliers and distributors, better use of raw materials (zero-waste), better management of storage, menu engineering, creativity, seasonality, provision of different portion sizes; involving kitchen staff, etc. b) at service stage: clear description of dishes on the menu, waiting staff must be able to explain every dish, describe portion sizes, make recommendations and answer any questions of the customers.	4

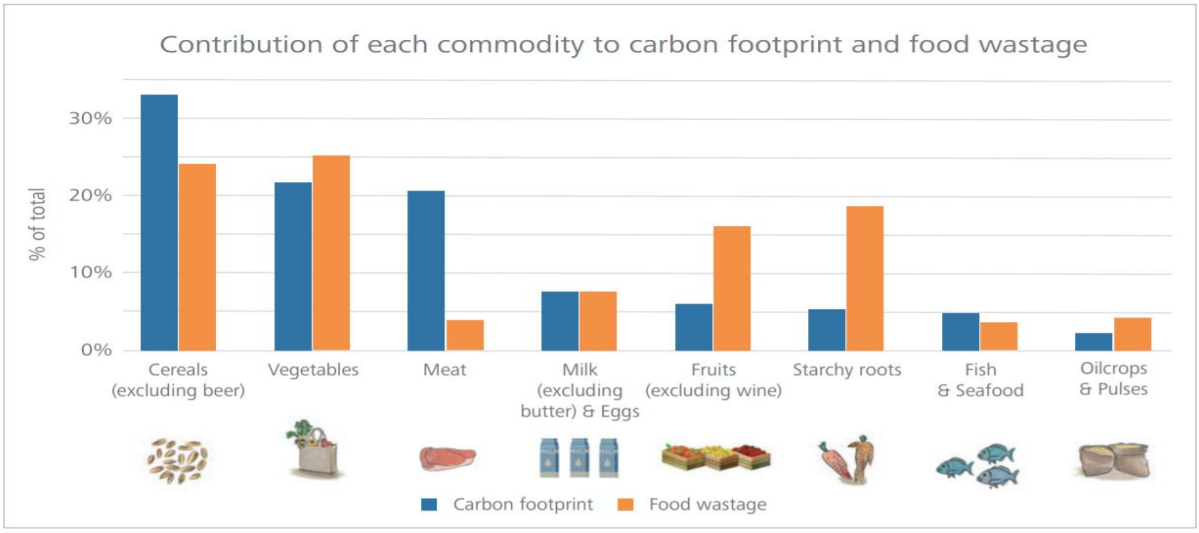
Recycling and reuse of waste generated in food industry. Redistribution

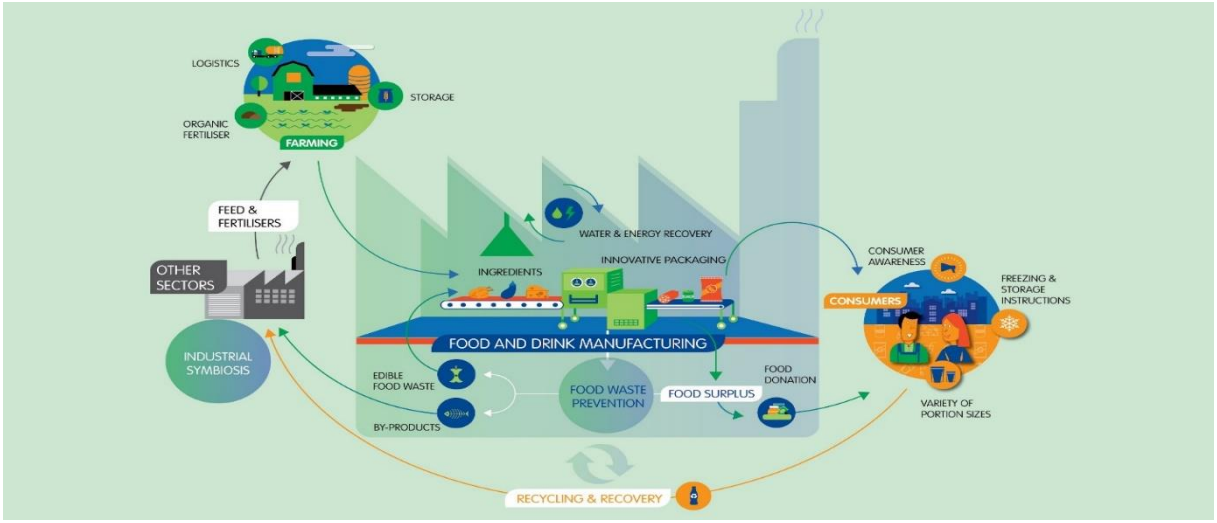
	Time guide-line (hours)
Ways of management/reuse of food industry waste: • using for other product production, • using for animal feed, • extracting biogas, • anaerobic composting, residual substrates for fertilization, • energy production by burning, • making innovative and biodegradable packaging, cutlery and plates, etc. Second opportunities for discarded food through redistribution. The role of Food Banks and other social institutions. Issues related to food redistribution: food bank infrastructure and logistics, food safety, market regulations, consumer rights, etc.	4

SOURCES FOR TEACHING MATERIAL:
Food waste in the EU https://food.ec.europa.eu/safety/food-waste_en
Waste Framework Directive https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en
https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en

Farm to Form Strategy https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en
Sustainable Food Waste Management for Food Industry SMEs https://www.unleashedsoftware.com/blog/sustainable-food-waste-management-for-food-industry-smes
Waste Management in Food Industry https://pecb.com/article/waste-management-in-food-industry ;
https://www.greatwesternrecycling.co.uk/reduce-food-waste/ ; https://www.eatingwell.com/longform/7957594/simple-ways-to-reduce-food-waste/ ;
https://fastercapital.com/startup-topic/Reducing-Food-Waste.html
https://kooljet.com/wp-content/uploads/whitepaper-food-waste-lores.pdf
AI in Food Industry https://www.atltranslate.com/ai/blog/ai-in-the-food-industry-food-waste ;
https://www.walkermorris.co.uk/in-brief/ai-in-the-food-and-drink-industry-a-game-changer-for-reducing-waste-and-emissions/ ; https://linkretail.com/ai-and-predictive-analytics-pioneering-food-waste-management-solutions-in-retail/
Zero-waste cooking https://amazingfoodanddrink.com/zero-waste-cooking/
Recycling Food waste https://www.engineeringforchange.org/news/food-waste-engineered-useful-products-circular-economy/
Reuse of biowaste https://www.sciencedirect.com/science/article/pii/S2212429223003620 ; https://moveforhunger.org/reusing-food-waste-scraps-leftovers ; https://www.science.org.au/curious/earth-environment/transforming-food-waste-making-something-out-rubbish
Biomaterials from organic waste https://fablabbcn.org/blog/emergent-ideas/biomaterials-101
Sustainable Food Packaging https://earth.org/sustainable-food-packaging/




Contribution of each commodity to carbon footprint and food wastage
% of total
30%
20%
10%
0%
Cereals (excluding beer)
Vegetables
Meat
Milk (excluding butter) & Eggs
Fruits (excluding wine)
Starchy roots
Fish & Seafood
Oilcrops & Pulses
Carbon footprint
Food wastage


LOGISTICS
STORAGE
ORGANIC FERTILISER
FARMING
FEED & FERTILISERS
OTHER SECTORS
INDUSTRIAL SYMBIOSIS
WATER & ENERGY RECOVERY
INGREDIENTS
INNOVATIVE PACKAGING
FOOD AND DRINK MANUFACTURING
EDIBLE FOOD WASTE
BY-PRODUCTS
FOOD WASTE PREVENTION
FOOD SURPLUS
FOOD DONATION
CONSUMER AWARENESS
CONSUMERS
FREEZING & STORAGE INSTRUCTIONS
VARIETY OF PORTION SIZES
RECYCLING & RECOVERY


FOOD WASTE HIERARCHY
ORGANIC WASTE PREVENTION
AVAILABLE INTERVENTIONS AT EVERY STEP FROM PRODUCTION TO TRANSPORTATION TO CONSUMPTION
FOOD RECOVERY
EDIBLE FOOD RECOVERY, PRIORITISING DONATIONS AND REDISTRIBUTION TO PEOPLE OVER ANIMAL FEED OR BIOCHEMICAL REPROCESSING
FOOD WASTE REPURPOSING
FOOD WASTE REPURPOSED INTO ANIMAL FEED
MATERIAL RECYCLING WITH HIGH IMPACT TREATMENTS:
COMPOSTING, ANAEROBIC DIGESTION
BIOSTABILISATION OF RESIDUALS
NEUTRALISE METHANE EMISSIONS
REMEDIATION
BIOLOGICALLY ACTIVE COVER, LANDFILL GAS CAPTURE TO BE IMPLEMENTED WITH CAUTION
INCINERATION
INCINERATION, CO-INCINERATION AND OTHER TYPES OF THERMAL TREATMENT ARE NEVER ACCEPTABLE

2. Implementation

Period of implementation

October 2023 - January 2024

Admission and organization of the training

The series of specialized short trainings was intended for managers and employees of food production and catering businesses as well as everyone interested in the topic.

Invitations to participate in the training were disseminated by emails, project newsletters and via Chamber website.
Participation in the training required at least basic competences, skills and practical experience in the area of sustainability and waste management.

Participants profile and organization of the training

As the training was implemented as separate online seminars, the number of participants varied during each of them (the average - 17).
The participants were representatives of various companies, mainly from catering, hospitality, food production sectors. Some seminars were also attended by VET teachers and students.

Execution of the training

The training was carried out as a series of online seminars on waste management with specific focus on food production and catering sectors. Each of them was delivered by different external lecturers and experts who gave valuable guidelines for businesses.
The topics covered included the following:

- Causes and consequences of food waste.
- Strategies to reduce food waste.
- Farm to Fork Strategy and other EU directives related to food waste.
- Food waste recycling solutions, e.g. for generating green energy and organic fertilizers.
- Sustainable solutions for food packaging.
- Use of AI for solving problem of food waste.
- Redistribution and donation of unsold food, etc.

The seminars included presentations, group discussions, exchange of good practice and case studies.

Main findings and conclusions

The participants were satisfied with the overall content of the training course. They stated they had gained new valuable insights and practical tips to be used in the future, e.g. on methods to reduce food waste, employee training, and efficient partnerships with local food recovery organizations. It was highlighted that addressing food waste requires a collective effort from individuals, businesses, and governments. Understanding its causes and impacts and working towards practical solutions can significantly reduce food waste, benefiting the environment and society.
The training curriculum can be adapted to country-specific context and modified accordingly taking into account specific needs of the participants, their previous experience and knowledge.
The curriculum will be used by Panevezys Chamber of Commerce, Industry and Crafts as the guidelines for organizing future seminars on the topics of food waste management.

Sustainable hotel practices[5]

1. Curricula

1.1 Objective and content of the curriculum:

The accommodation sector is considered one of the most harmful to the environment, along with the industrial sector, therefore environmental issues have become extremely important for this business.

The core principle of green hospitality is to create a comfortable and luxurious experience for guests while minimizing the environmental impact of hotel operations. This involves adopting sustainable practices, investing in eco-friendly technologies, and promoting awareness of environmental issues.

The demand for green goods and services continues to rise as consumers become more conscious of environmental issues. Traveler's, especially young ones, are becoming more and more environmentally conscious. Eco-friendly accommodation services are considered key factor in their decision to travel and book.

This short training course aims to provide participants with knowledge about the importance, necessity and advantages of introducing sustainable measures in hospitality establishments. It will also provide them with practical examples how business or personal activities can be transformed in order to reduce environmental footprint.

Target group

Entrepreneurs, managers and employees of hospitality / accommodation sector as well as VET teachers delivering lessons on hospitality business.

Type of the course

Training course for further education or additional qualification, its content is mainly suitable for EQF level 4. The training can be implemented both in face-to-face and online forms.

Study form and methods

Methods: lecture, presentation, group discussion, analysis of best practice cases, company visits.

Duration

8 - 12 hours.

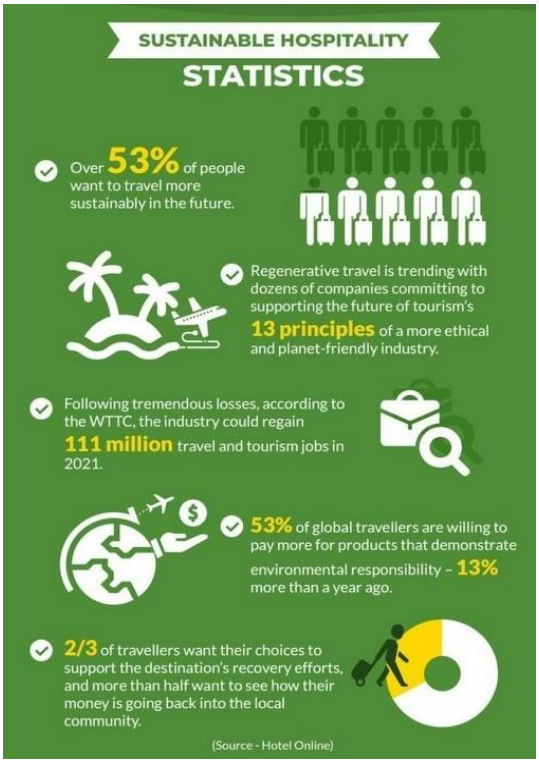
1.2 Course Contents

Module	Content	Time guide-line (hours)

[5] Prepared by Panevezys Chamber of Commerce, Industry and Crafts

Introduction of CE. Why is it necessary?	Importance of Circular economy and introducing its measures in the hotel sector. Statistical data on the environmental impact of accommodation establishments (e.g. on waste amount generated in the sector.) Environmental effect of taking a trip. Choices made by m*ore responsible and environmentally conscious travelers.*	0,5 - 1
Key sustainability measures <u>Areas</u>: Booking system Energy Water Waste management Supply chain Use of chemicals and plastic Upcycling Other	Examples of ways to improve environmental performance within a hotel business. - Smart booking system (room heating, cooling and air ventilation systems automatically adjusted to an absolute minimum in unoccupied areas). - Switching from plastic keycards to digital systems. - Use of renewable energy (solar panels, thermal plants) and energy conservation practices. - Installing energy-saving devices. - Biological water purification, grey water reuse, reduction of potable water consumption, water conservation measures. - Sustainable waste management - separating different types of waste in order to increase their reuse value. - Reducing food waste: smart technologies to track kitchen waste and customer plate waste; reducing plate sizes for buffet operations; more on-the-go preparation and cooking rather than large batches in advance; selling or sharing leftover food; composting, etc. - Circular supply chain - purchase of products from local sustainable businesses. - Code of conduct for suppliers. - Minimizing use of chemicals, replacing them with eco-friendly hotel cleaning products. Less plastic and single-use packaging (biodegradable options instead). - Using upcycled furniture. - Guest engagement and education. Offering eco-friendly services. Green initiatives and activities.	4 - 6
Green Key Programme	The Green Key program and criteria for establishment certification. Why is it important?	0,5 - 1

Best practice case studies / company visit **Discussion**	Analysis of best practice examples and / or a study visit to a sustainable accommodation establishment. Discussion in groups on the following topics: • Participants think about hotels / accommodation where they have worked / stayed at as guests and consider what measures could support a more sustainable experience. • Being environmentally conscious is the responsibility of both the traveler and the hotel.	2 - 3
Summary **Advantages and barriers of introducing CE measures**	Positive impact: helping the environment; reducing operational costs; boosting revenue (attracting more bookings by environmentally conscious travelers**);** improvement of brand image and reputation; optimization of supply chain; increased employee engagement; stimulation of innovative practices in the organization, etc. Examples of barriers: time pressures, financial demands, lack of resources, age of a hotel property; the views of owners and shareholders of the hotels. Conclusion - making efforts towards providing greener and more sustainable tourism accommodation and food can offer lots of benefits and cost savings while ensuring the conservation of the environment.	1



2. Implementation

Period of implementation

November - December 2023

Admission and organization of the training

The specialized short training was intended for managers and employees of hospitality sector, VET teachers and everyone interested in the topic. Invitations to participate in the training were sent to companies and educational institutions.

The number of participants in the seminars varied from 21 to 29. They were representatives of hospitality business and lecturers of VET schools.

Execution of the training

The training was implemented according to the curriculum developed by Panevezys CCIC as a series of 3 seminars with total duration of 9 hours.

The topics covered included the following:

- Importance of Circular economy in the hotel sector.
- Choices made by environmentally conscious travelers – reason for changes.
- Sustainability measures in accommodation establishments (booking systems, energy, water, waste, supplies, and other areas).
- Case studies.
- Discussions on advantages of introducing sustainability measures and barriers preventing from doing this.

The lecturers were invited experts from Lithuanian Association of Hotels and Restaurants and the Green Key program. As the training was attended by people working the hotel business, they had a perfect chance to share their practical experiences and tips how to make accommodation services more sustainable.

The seminars included presentations, group work, discussions, exchange of good practice and case studies.

Main findings and conclusions

The participants have stated that the overall content of the training course was good, they gained new insights and useful practical tips during the training, and they would be able to use the gained knowledge in the future.

The content and duration of the training can be adapted to a country-specific context and modified in accordance with specific needs of the participants, their previous experience and knowledge.

The training will be used by Panevezys Chamber of Commerce Industry and Crafts as the guidelines for organizing future longer trainings or separate shorts seminars on the topics of sustainable hotel practices.

EQF course for Industrial Symbiosis Facilitator[6]

1. Executive summary

Given the limits in sustainability of the linear economy model "take-make-consume-dispose", the Circular Economy (CE) is the new framework in which the INSIGHT training course has been proposed, as the logical and viable alternative to correct the main problems of this linear scheme at industrial level.

INSIGHT is a training course dedicated to the profile of the Facilitator for activating the Industrial Symbiosis networking. Developed through the Erasmus + KA2 funding, the INSIGHT training program has been piloted and the good results reached convinced SFC Sistemi Formativi Confindustria to integrate INSIGHT course in the Italian national VET training offer for SMEs and Public Authorities.

Prior to understanding what the facilitator does, it is important to understand what industrial symbiosis is. The Industrial Symbiosis (IS) is a waste-as-resource business models aiming to use waste a resource promotes cross-sector and cross-cycle links by creating markets for secondary raw materials.

The IS systemic approach impacts on several levels of the sustainability and circular economy principle:

- At the macro level, IS contributes to the achievement of SDGs 9,11 12 and 13 as per the following considerations:
  The IS stimulates the R&I applied to Industrial systems, as it is necessary to identify new uses for by-products, define new business model and redesign functional supply chain systems.
  The IS is a practice based on local community identity, as long by-product recovery loops could be counterproductive. The resource exchanges underlying the IS process primarily impact the local community, and that is why it is necessary to engage a wide range of stakeholders to set up these processes.
  The IS paves the way towards less raw materials-consuming productive process.IS triggers a continuous recycling system between different production processes, because at the end of a production process, waste or "output" produced by a company can be reborn into a valuable raw material or "input" for another process and company.
  IS optimizes the use of resources by reintroducing processing waste back into the production cycle and avoiding landfilling. This means less land use for landfill, less release of processing waste into the environment even though it is difficult to find a closed loop IS cycle (i.e. where all resources are reused without producing any waste).
- At the meso level, IS provides efficient resource management and control of pollutant emissions on a production cluster level in each area. The first step to initiate an IS process is, in fact, the detailed knowledge of the waste produced: qualitative, chemical, and physical analyses of the materials coming out of the

[6] Prepared by SFC Sistemi Formativi Confindustria

production systems makes all production players more conscious of the activities' impact on the local community. Using this knowledge, the IS opens exchange relationships between companies operating in the same area. IS is an enabling factor for the regional development strategy (S3).

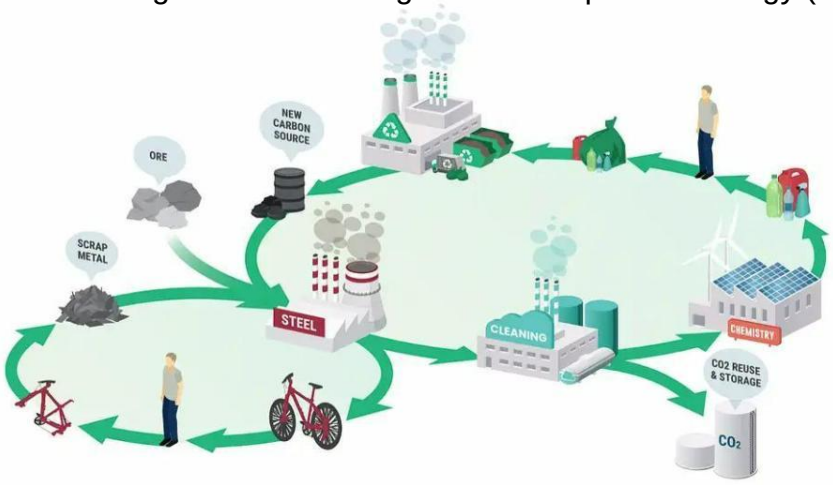


Figure 1 The Industrial Symbiosis way to produce. Source: E. Kennedy from „Big flows, big impacts: the economic, environmental, and social benefits of industrial symbiosis"[7]

- At the micro level, the focus is on the consumer, the entrepreneur, and the worker but also on the public administration decision-maker, the BSOs' civil servant accompanying production systems towards circular economy criteria. IS is a circular resource management system that benefits all stakeholders in exercising their rights as citizens and workers, committed to sustaining the balance of the natural ecosystem. In these terms, IS is a concrete way to translate EU and global policies and strategies on the sustainability of production systems into concrete practices to improve the quality of the environment, and thus the quality of life for all. Finally, the dissemination of the presence and operation of IS circuits on the territory and in the different application fields (also for hydrogen production, for example) raises everyone's awareness on the correct management of waste and its value, making them responsible for the correct disposal of waste.

The INSIGHT course trains the Industrial Symbiosis Facilitator, a professional profile which is responsible for conducting analysis in its area of influence, with the ability to define and promote synergies between companies from different sectors, as well as to capitalize on the benefits of Circular Economy principles and their implementation.

[7] https://www.metabolic.nl/news/big-flows-big-impacts-the-economic-environmental-and-social-benefits-of-industrial-symbiosis/

The INSIGHT training course is the result of a European Erasmus KA2 project, realized from 2019 to 2021 by the partnership representing:

- Experts in Industrial Symbiosi process: ECORES (BE) specialized in Circular Economy research and studies, SIMBIOSI INDUSTRIAL SL Center or Research (ES), and the STYRIAN TECHNOLOGY PARK (SI)
- VET Providers experienced in delivery of 5 EQF Continuing VET courses to companies. Among them there are SFC Sistemi Formativi Confindustria (IT) manufacturing cross-sectorial organization and CETEM ASOCIACIÓN EMPRESARIAL DE INVESTIGACIÓN CENTRO TECNOLÓGICO DEL MUEBLE Y LA MADERA DE LA REGIÓN DE MURCIA (ES) representative of the Consumers, by the participation of CNPCD – Asociatia Centrul National pentru Productie si Consum Durabile (RO)

The main activities the Industrial Symbiosis Facilitator should be able to perform are:

1 Facilitate networking, communication and exchange between companies

2 Update companies on legal context and opportunities for IS

3 Perform Systems Evaluation

4 Propose IS Business Model

5 Monitor performances of the IS Business Model

The European learning service delivered through INSIGHT Project has been designed according to the ECVET qualification system, tested in 5 countries: Italy, Spain, Belgium, Slovenia and Romania. The results made it possible to validate the training course, which was integrated into the ordinary training offer of SFC and other entities participating in the project.

The proposal to include INSIGHT in the 3LoE COVE is in line with the objective of giving concrete support to SMEs to move into the green transition scenario launched with the European Green Deal. Moving forward, the single standard of zero net greenhouse gas emissions by 2050 is being articulated in detailed plans for sustainable industrial development (Net-Zero Industry Act, Critical Raw Materials Act, Reform of the electricity market design etc.), for traceability and sustainable supply chains (DNSH Do Not Significant Harm principle, DPP – Digital Passport for Products, etc.).

In such a complex and intertwined system of policy and innovation opportunities, the profile of the facilitator for grounding of sustainable production solutions is strategic.

Given the multi-disciplinary nature of industrial symbiosis, the facilitator is in charge to activates the network between experts (R&I, universities, technology centres), production clusters (business representatives, local government representatives, consumer representatives), decision makers to activate, monitor and renew IS circuits.

2. Target and Admission

Given the duration and purpose of this training course, INSIGHT fits appropriately into a Continuing Education target, as a specialization, upskilling and re-skilling course.

INSIGHT is a training course designed according to the articulation of knowledge, skills and competences corresponding to the 5 level of the European Qualification Framework (EQF) It means that, based on the EQF, the IS Facilitator's learning outcomes should be compliant to the following descriptions:

Knowledge: Comprehensive, specialized, factual and theoretical knowledge within a field of work or study, and an awareness of the boundaries of that knowledge

Skills: A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems.

Autonomy: Exercise management and supervision in contexts of work or study activities where there is unpredictable change. Review and develop performance of self and others.

Regarding the admission procedures, the INSIGHT training pathway stems from a bottom-up approach to identify the skills needed for grounding the Circular Economy into the companies' work-process. In this sense, INSIGHT represents an innovation in the training scenario and does not find direct correspondence in ESCO descriptors. This affects the selection procedures which could involve a broad spectrum of professionals. Nevertheless, it is important that the INSIGHT candidates have previous knowledge in at least 4 of the following 6 discipline areas:

- environmental engineering
- production and industrial systems engineering
- scientific communication
- industrial symbiosis
- management of public-private partnerships
- circular economy

3. The INSIGHT Curriculum

Consisting of 5 training modules, the INSIGHT training pathway is outlined in the table below:

MODULE 1	*IS THEORY, CONCEPTS AND CONTEXT*			
TRAINING UNIT	OBJECTIVE	LEARNING OUTCOME	PEDAGOGICAL APPROACH	ASSESMENT METHODOLOGY
1.1 INTRODUCTION TO CIRCULAR ECONOMY	Introducing to concepts of Circular Economy and describing its evolution over time	**Knowledge:** Have knowledge of Circular Economy concepts and its evolution over time. **Skills:** Distinguish the main concepts of Circular Economy. **Competences**: Autonomous ability to apply concepts of circular economy.	Text PowerPoint Video	Quiz
1.2 INTRODUCTION TO INDUSTRIAL SYMBIOSIS	Introducing to history, concepts, typology of networks, methodologies, barriers and impact of Industrial Symbiosis via a triple bottom-up approach (social, economic and environmental) and the role of the IS facilitator	**Knowledge**: Have knowledge about the fundamentals of Industrial Symbiosis. **Skills**: Distinguish the main steps of IS methodologies, identify barriers and impact. **Competences**: Autonomous ability to define and plan IS projects using a triple bottom-up approach.	Text PowerPoint Video	Quiz
1.3 CIRCULAR ECONOMY AND INDUSTRIAL SYMBIOSIS AT EU LEVEL	Describing international and EU regulation framework in the field of Circular Economy and IS including waste and resources regulations and policies	**Knowledge:** Understand the fundamentals of EU regulations on Circular Economy, IS, waste and resources. **Skills:** Recognize relevant EU regulations for specific IS projects. **Competences**: Autonomous ability to inform about relevant EU policies.	Text PowerPoint Video	Quiz
ASSESSMENT	Assessing and validating the acquired learning outcomes			

MODULE 2	*RESOURCE MANAGEMENT*			
TRAINING UNIT	OBJECTIVE	LEARNING OUTCOME	PEDAGOGICAL APPROACH	ASSESSMENT METHODOLOGY
2.1 SOURCE CIRCULARITY	Introducing how resources circulate, cycles, levels, how they are incorporated in eco-systems and their sustainable provision	**Knowledge:** Understand how resources circulate, their cycles, levels, how they are incorporated in eco-systems and their sustainable provision. **Skills:** Describe how resources circulate, distinguishing cycles and levels. **Competences:** Autonomous ability to identify how resources can be integrated in eco-systems.	Text PowerPoint Video	Quiz
2.2 RESOURCES MANAGEMENT : FOCUS ON WASTE MATERIALS	Describing how to manage materials derived from waste and zero waste strategies	**Knowledge:** Understand how materials derived from waste can be incorporated in ecosystems and what are the best practices in terms of zero waste strategies. **Skills:** Describe how materials derived from waste can be incorporated in ecosystems and what are the zero waste strategies. **Competences**: Autonomous ability to examine how waste materials can be incorporated in IS ecosystems and to apply relevant zero waste strategies.	Text PowerPoint Video	Quiz
2.3 RESOURCES MANAGEMENT : FOCUS ON WATER RESOURCES	Describing how to plan, develop, distribute and efficiently manage water resources	**Knowledge:** Understand how water resources are planned, developed, distributed and efficiently managed. **Skills:** Describe how water resources are planned, developed, distributed and efficiently managed. **Competences**: Autonomous ability to examine how water resources can be optimised in IS ecosystems.	Text PowerPoint Video	Quiz
2.4 RESOURCES MANAGEMENT : FOCUS ON ENERGY	Describing how to manage and optimise the usage of energy resources and its transition	**Knowledge:** Understand designs, processes and solutions for the optimal management and efficient usage of energy resources. **Skills:** Describe designs, processes and solutions for the optimal management and efficient usage of energy resources. **Competences**: Autonomous ability to examine how energy resources can be efficiently optimised in IS ecosystems.	Text PowerPoint Video	Quiz
ASSESSMENT	Assessing and validating the acquired learning outcomes			

MODULE 3	*IS MANAGEMENT*			
TRAINING UNIT	OBJECTIVE	LEARNING OUTCOME	PEDAGOGICAL APPROACH	ASSESSMENT METHODOLOGY
3.1 SYSTEM-THINKING APPROACH TO IS	Describing system-thinking approach and its role in IS	**Knowledge:** Understand the benefits deriving from effective application of system-thinking. **Skills:** Apply successful system-thinking approach. **Competences:** Autonomous ability to carry out systematic analysis.	Text PowerPoint Video	Quiz
3.2 DATA COLLECTION AND RESOURCES FLOW ANALYSIS	Describing methods of data collection, resources flow analysis and its understanding	**Knowledge:** Have knowledge of methods for data collection, resource flow analysis and LCA. **Skills:** Gather relevant data and distinguish the main steps of resources, waste flows and LCA analysis. **Competences**: Understand the results derived from resource flow analysis and LCA.	Text PowerPoint Video	Quiz
3.3 EXISTING CIRCULAR ECONOMY AND IS PLATFORMS	Describing available platforms for the facilitation of Circular Economy and IS	**Knowledge:** Have knowledge about available platforms for the facilitation Circular Economy and IS. **Skills:** Ability to identify most appropriate Circular Economy and IS platforms. **Competences**: Independently conduct cross-sectorial and multi stakeholders' analysis by using dedicated Circular Economy and IS platforms.	Text PowerPoint Video	Quiz
3.4 FINANCIAL OPPORTUNITIES FOR IS (ANNEX ON SUPPORTING ENTITIES)	Describing available funding opportunities on EU level and relevant national entities, who can support IS projects	**Knowledge:** Have theoretical knowledge about EU funding programmes, schemes and relevant national entities. **Skills:** Ability to identify appropriate financial incentives and funding opportunities on the EU level and relevant national entities. **Competences**: Autonomous ability to inform about relevant financial opportunities and to evaluate outsourcing for legal and financial advice.	Text PowerPoint Video **Annex: supporting entities on EU and national level**	Quiz
3.5 IS BUSINESS MODEL	Describing how to build an effective and sustainable business model based on identified IS opportunities	**Knowledge:** Have theoretical knowledge about the concepts of value creation and business models in IS. **Skills:** Ability to generate, select and evaluate IS opportunities based on different perspectives (financial, economic, environmental, social). **Competences**: Autonomous ability to convey the knowledge about IS business models to the project team and facilitate the developments of a new business model.	Text PowerPoint Video	Quiz
ASSESSMENT	Assessing and validating the acquired learning outcomes			

MODULE 4	*SOFT SKILLS FOR IS*			
TRAINING UNIT	OBJECTIVE	LEARNING OUTCOME	PEDAGOGICAL APPROACH	ASSESSMENT METHODOLOGY
4.1 PITCHING IS	Describing how to effectively communicate and pitch about IS benefits to stakeholders	**Knowledge**: Understand the benefits of effective communication and pitching of IS benefits. **Skills**: Explain the benefits derived from applying synergies of IS to stakeholders. **Competences**: Ability to pitch IS and instruct stakeholders on how it can benefit their businesses on different levels.	Text PowerPoint Video	Quiz
4.2 ENTREPRENEURSHIP, DESIGN THINKING STRATEGIES AND CO-CREATION METHODS	Describing entrepreneurial mindset, strategies of design thinking and co-creation methods for the formulation of innovative solutions in IS	**Knowledge:** Have knowledge about entrepreneurial mindset, strategies of design thinking and methods of co-creation. **Skills:** Ability to develop an entrepreneurial mindset and identify the most appropriate strategies of design thinking and methods of co-creation. **Competences**: Autonomous ability to apply entrepreneurial mindset, strategies of design thinking and methods of co-creation for the formulation of innovative solutions in IS.	Text PowerPoint Video	Quiz
4.3 MODELS OF COLLABORATION AND INTER-COMPANIES TEAM WORK	Describing how to implement models of collaboration and carry out successful inter-companies team work	**Knowledge:** Have knowledge about models of collaboration to facilitate inter-companies team work, brainstorming and decision-making. **Skills:** Ability to identify most appropriate models of collaboration. **Competences**: Autonomous ability to organize and efficiently manage inter-companies team work.	Text PowerPoint Video **Annex: Tools for collaboration**	Quiz
ASSESSMENT	Assessing and validating the acquired learning outcomes			

MODULE 5	*IS CASE STUDIES*			
TRAINING UNIT	OBJECTIVE	LEARNING OUTCOME	PEDAGOGICAL APPROACH	ASSESSMENT METHODOLOGY

MODULE 4	*SOFT SKILLS FOR IS*			
TRAINING UNIT	OBJECTIVE	LEARNING OUTCOME	PEDAGOGICAL APPROACH	ASSESSMENT METHODOLOGY
4.1 PITCHING IS	Describing how to effectively communicate and pitch about IS benefits to stakeholders	**Knowledge**: Understand the benefits of effective communication and pitching of IS benefits. **Skills**: Explain the benefits derived from applying synergies of IS to stakeholders. **Competences**: Ability to pitch IS and instruct stakeholders on how it can benefit their businesses on different levels.	Text PowerPoint Video	Quiz
4.2 ENTREPRENEURSHIP, DESIGN THINKING STRATEGIES AND CO-CREATION METHODS	Describing entrepreneurial mindset, strategies of design thinking and co-creation methods for the formulation of innovative solutions in IS	**Knowledge:** Have knowledge about entrepreneurial mindset, strategies of design thinking and methods of co-creation. **Skills:** Ability to develop an entrepreneurial mindset and identify the most appropriate strategies of design thinking and methods of co-creation. **Competences**: Autonomous ability to apply entrepreneurial mindset, strategies of design thinking and methods of co-creation for the formulation of innovative solutions in IS.	Text PowerPoint Video	Quiz
4.3 MODELS OF COLLABORATION AND INTER-COMPANIES TEAM WORK	Describing how to implement models of collaboration and carry out successful inter-	**Knowledge:** Have knowledge about models of collaboration to facilitate inter-companies team work, brainstorming and decision-making. **Skills:** Ability to identify most appropriate models of collaboration. **Competences**: Autonomous ability to organize and efficiently manage inter-companies team work.	Text PowerPoint Video **Annex: Tools for collaboration**	Quiz

MODULE 5	*IS CASE STUDIES*			
TRAINING UNIT	OBJECTIVE	LEARNING OUTCOME	PEDAGOGICAL APPROACH	ASSESSMENT METHODOLOGY
5.1 IS CASE STUDIES: TERRITORIAL APPROACH	Describing real case studies of Industrial Symbiosis with a territorial approach	**Knowledge:** Have knowledge of how IS is territorially applied **Skills:** Ability to identify applied IS principles and methodologies. **Competences**: Enhanced ability to autonomously plan IS projects based on real cases.	Text PowerPoint Video	Quiz
5.2 IS CASE STUDIES: INDUSTRIAL PARK APPROACH	Describing real case studies of Industrial Symbiosis applied by industrial parks	**Knowledge:** Have knowledge of how IS is applied by industrial parks. **Skills:** Ability to identify applied IS principles and methodologies. **Competences**: Enhanced ability to autonomously plan IS projects based on real cases.	Text PowerPoint Video	Quiz
5.3 IS CASE STUDIES: COMPANY APPROACH	Describing real case studies of Industrial Symbiosis applied by companies	**Knowledge:** Have knowledge of how IS is applied by companies **Skills:** Ability to identify applied IS principles and methodologies. **Competences**: Enhanced ability to autonomously plan IS projects based on real cases.	Text PowerPoint Video	Quiz
ASSESSMENT	Assessing and validating the acquired learning outcomes			

Course Duration

The duration of the INSIGHT course is estimated in 150 hours, comprises:

Study hours → the time needed to read the training materials.

Self-study hours → the time needed to understand the training materials and to read additional materials.

Contact hours → questions launched in specific forums and interaction with other students.

Practical exercises → required sessions of practice.

Self-assessment → the time needed to prepare the assessment and execute it.

Assessment

The evaluation of INSIGHT competences can take place in two ways, depending on the course delivery mode.

Mode 1: the entire course is delivered online. In this case, 100% of the evaluation is done by means of quizzes to establish the acquisition of competences.

Mode 2: the course is realised in blended mode, participating in at least at 1 study visit. In this case, 80% of the evaluation is done via quizzes at the end of each online module, 20% comes from the evaluation report.

The design and delivery of the visit is an integral part of the blended learning experience and as such allows for the observation and detection of specific and determining elements of the facilitator's role in the case.

Certificate

The amount of ECVET points allocated to a learning unit depends on two factors:

Time needed to acquire the learning outcomes in the specific unit.

Relevance of the learning outcomes in the specific unit.

Based on the assumptions of the ECVET Secretariat and several national authorities, ECVET credits are assigned on a system of 1 ECVET = 1 ECTS = 25 hours of total learning. This includes also non-formal and informal learning.

There is not a specific criterion to define the time spent on studying, self-studying, contacting, doing practical exercises and self-assessment, as there are many different areas, fields and objectives in VET. Nevertheless, the high quality of the training materials and the validation of learning outcomes help ensure that results are efficiently achieved. The following table showcase an attempt to estimate of ECVET points for each INSIGHT training module, based on time, relevance and weight.

INSIGHT			
EQF level - 5			
Training modules	Learning Duration (in hours)	Relevance and weight (in %)	No. of ECVET points
MODULE 1. IS THEORY, CONCEPTS AND CONTEXTS	21	14%	0.84
MODULE 2. RESOURCE MANAGEMENT	34,5	23%	1.38
MODULE 3. IS MANAGEMENT	31,5	21%	1.26
MODULE 4. SOFT-SKILLS FOR IS	25,5	17%	1.02
MODULE 5. IS CASE STUDIES	37,5	25%	1.5
TOTAL	150	100%	6

4. Execution of the training

This section is developed based on the results of the INSIGHT training course that started on 13 September 2022 and ended on 15 December 2022. The course was realized online. It involved 12 participants with heterogeneous employment backgrounds.

Out of 12 participants, 6 realized the full INSIGHT course, while 4 persons realized about 0% per cent of the total number of hours, and 2 persons realized less than 70 % of the total 7 number of hours of the entire training course.

The most popular modules were:

1. IS Theory, Concept and context.
3. IS Management
5. IS Case studies

The online INSIGHT training is an individual training path: it means that it is autonomously managed by the student.

The INSIGHT training materials is uploaded and available on the YoulearnSFC platform.

Green Public Procurement for SMEs[8]

1. Executive summary

The Green Public Procurement (GPP) is defined as "a process whereby public authorities seek to produce goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be produced." In order to be effective, GPP requires the inclusion of clear and verifiable environmental criteria for products and services in the public procurement process, which cause minimal adverse environmental impacts [1].

The Green Public Procurement will be increasingly used by all level of governments as a strategic tool in order to achieve the European Green Deal challenge and international targets on circular economy. As recently highlighted by OECD (2019) to address barriers and realise the benefits from GPP, the need to increase the engagement of a variety of stakeholders and "develop a procurement workforce with the capacity to continually deliver value for money efficiently and effectively" do not affect only public officers.

Companies' participation in the adoption of strategic policy objectives for sustainability is a key factor to set a realistic path to make "Europe the first climate-neutral continent by 2050".

The GREENER course has been developed through a European Erasmus partnership representing:

- University specialised in Green Economy (Scuola Superiore Sant'Anna di Pisa)
- VET Providers experienced in delivery of 5 EQF Continuing VET courses to companies (SFC Sistemi Formativi Confindustria, Cleantech Bulgaria, CETEM, Consultancy Bulgarian Organisation)
- representative of the Public Administration approach to the Circular Economy (ACR+).

GREENER

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

Both Public and Private stakeholders, Technicians and Experts in the Green Economy and business services cooperated to define a training path and a methodology to support companies' participation in GPP. The GREENER training path aims to improve the systemic effectiveness between sustainability and business competitiveness. To do this, the skills of middle management and the more traditional profiles of the administration need to be updated. A systemic action of renewal of the VET paths addressed to these profiles is the priority of GREENER training path.

The objectives of GREENER course are:

[8] Prepared by SFC Sistemi Formativi Confindustria

- Improve the skills of procurers and administrative profiles focusing on SMEs, with regard to GPP criteria, including ecolabels, material passports, product eco-design and design for recyclability, extended producer responsibility, waste prevention, packaging material and sharing, collaborative economy, reuse, and refurbishment.
- Enhancing the responsiveness of curricula of traditional profiles, such as administrative professionals working in SMEs tendering departments, to the future demand of skills (upskilling – reskilling training path).
- Increasing the employability of VET students facing the global challenges.
- Improve regional actors' readiness and create knowledge awareness on the influence of green public procurement on the adoption of sustainable consumption and production patterns by businesses operating in the region.
- Foster the VET attractivity relaunching the close cooperation between VET, public administrations, government agencies and bodies established to support SME development and SMEs, the Transparency Tools for skills validation and trainers' capacity to apply an international mindset for education.

The European learning service delivered through GREENER Project has been designed according to the ECVET qualification system, tested in 4 countries: Italy, Spain, Belgium, Bulgaria. The results made it possible to validate the training course, which was integrated into the ordinary training offer of SFC and other entities participating in the project.

The proposal to include GREENER in the 3LoE COVE revives the interest of expanding the green skills by SMEs, initiating further adaptations of the GREENER training course to local contexts with respect to the national Green Public Procurement state of art, and European legal framework on the Green Deal.

2. Target and Admission

The GREENER course is designed to target the middle management and administrative profiles of the small and medium enterprises (SMEs). It is a Continuing VET path supporting the staff of SMEs in acquiring appropriate practical skills, knowledge, and access to information in order to successfully implement Green Public Procurement.

Since it is an EQF level 5 course., the admission rules require students already completed an EQF4 qualification. In other words, the entry level of GREENER students could be:

- ISCED level 3 – Upper secondary education
- ISCED level 4 – post-secondary non-tertiary education
- ISCED level 5 – Short-cycle tertiary education

The aim of the course is to boost new green skills and update administrative profiles operating into the companies, to deal with the increasing green public and private procurement. This new professional will serve as an internal advisor to allow the company

to comply with the needs of the PAs and privates looking for green and circular purchases.

Considering the study topics GREENER provides and the exit skills profile, it is recommendable that students have a technical or professional training background in:

- Business Administration, corporate accounting,
- Product and production process quality certification systems
- Supply chain and product life cycle
- Management and business services

The background may also be considered based on previous work experience related to the previous topics.

3. GREENER Curriculum

The Course consist of 5 modules, each providing to the participant different level of learning outcomes:

Module 0- Introduction to GPP concept and the training path

Module 1 – To know what GPP is and why could be an opportunity for SMEs.

Module 2 – To understand and to find public tender.

Module 3 – To comply with sustainability requests from PAs.

Module 4 – To create awareness inside SME on the opportunity for GPP.

Module 5 – To improve the chances for a successful application.

Learning outcomes	**Recommended content to achieve the learning outcomes**
Know and check the GREENER training course structure and principles.	0. Topic: to know the GPP benefits and challenges for SMEs Tasks 0.1 Describe benefits from implementing the GPP 0.2 Explain target, sensitive objectives for improving the green performance of products and processes 0.3 Choose the GREENER program meeting the company's need and the person's interest
Ability to explain the basis for working with GPP, its principles and the potential opportunities for SMEs. Assess the SME's interest in developing own GPP plan	1. Topic: To know what GPP is and why could be an opportunity for SMEs Tasks: 1.1 Recognise the GPP market 1.2 Describe what are the benefits for SMEs in participating in green and circular tenders 1.3 Assess company and personal training needs with respect to GREENER training path
Aptly choosing the green public tender considering the SME's potential offer	2. Topic: To understand key vocabulary to interpret a green public tender Tasks:

	2.1 Recognise the different phases of the procurement lifecycle, from pre-publication through post-award 2.2 Assess the criteria of the GPP in a tender
Know the specific sustainability requirements and requests from public authorities when implementing GPP	3 Topic: Comply with sustainability requirements from public administrations Tasks: 3.1 Map environmental requirements into tender procedures 3.2 Knows Life-cycle costing (LCC) and can assign costs to environmental externalities 3.3 Manage the different functions of inspection, control, audit, and evaluation applicable to public procurement
Learn how to promote the GPP in SMEs, through the implementation of an action plan.	4. Topic: To create awareness inside the SMEs on GPP opportunities Tasks: 4.1 How to plan and act the GPP Action Plan for SMEs 4.2 Application of good practise examples in planning and reduction of waste
Improve the chances for a successful application with specific methods for preparing the best proposal	5. Topic: How to improve company sustainability for a successful application to GPP Tasks: 5.1 Understand the process and product certification implications for SMEs 5.2 Knows how to select and manage a Sustainable supply chain management 5.3. How to apply the Environmental claim principles

N.	Module Name	Content	Training Time	
			Contact Hours	Self-Study Time
0	**Introduction to GPP**	0.1 The GREENER Project - Aims/Goals of the Project; 0.2 What makes the GPP important? - Target form EU Green Deal and SDG goals 0.3 Who is the training course aimed at? - Targeted stakeholders. 0.4 The Modular Training Course - Modules of the Course. 0.5 Self-assessment tool	**4**	**2**
1	**Circular and Green Public Procurement, an opportunity for SMEs**	1.1 Public and Private Procurement - What is procurement and the economic, social, and environmental impacts associated 1.2 What is Green Public Procurement - GPP - Definition of GPP and explanation of the procurement process - GPP and Circular Economy and climate - How can CPP/ GPP support the transition towards a CE and climate targets, - CPP/GPP opportunities/benefits 1.3 General European Framework - Procurement directives 2014 - Technical specifications	**8**	**12**

		- Award criteria - Contract performance 1.4 Benefits for SMEs to get involved in CPP/GPP - Economic: create opportunities for growth - Social: improve social responsibility of organisation - Environmental: contribute to environmental protection 1.5 GPP in practice - Focus on SMEs case examples		
2	**Understanding and finding public tenders**	2.1 Key vocabulary and phases of the procurement lifecycle 2.2 e-Procurement 2.3 Different procedures of public procurement 2.4 How to understand a tender 2.5 How to prepare a proposal: how to prepare requested documentation 2.6 Public tender platforms and search strategies	**8**	**12**
3	**Comply with sustainability requirements from public administrations**	3.1 The four fundamentals aspect of Green Public Procurement - structure of the European minimum environmental criteria - member states' objectives on the Green Public Procurement - Green Public Procurement and circular economy (circular purchases) - European Green Public Procurement instruments 3.2 Recognize a green tender: characteristic of the subject of the tender - Structure of the technical specifications - Basic requirements - Other requirements - Contractual clause 3.3 How to demonstrate compliance with the requirement - Certifications as means of proof (iso, emas, ecolabel) - The principle of equivalence 3.4 The access criteria - Demonstrate the skills to be able to participate - The criteria for awarding the contract - The most economically advantageous tender - Life Cycle Costing 3.5 Management and compliance with contractual - Management of supplier requirements	**8**	**16**

		- Reporting of activities aimed at meeting consistency with the requirements (work progress at the end of the payment) - Internal audit, control, and monitoring - Private procurement		
4	**To create awareness inside the SMEs on GPP opportunities**	4.1 Preparation - Determination of the current level of awareness, - Identifying the areas to be improved - Set realistic goals and timelines 4.2 Action plan - Using internal communication channels to raise awareness inside the SME - Choose the right person to lead the awareness campaign/message - Gain personal engagement 4.3 Support/ follow up - Regular campaigns to raise the awareness - Employ assistance - Sharing experience and knowledge between colleagues 4.4 Make significant changes - Create (adapt) policies 4.5 Examples for best practices - GPP implementation - Raising awareness in SMEs	**8**	**16**
5	**How to improve company sustainability for a successful application to GPP**	5.1 Introduction to sustainability 5.2 Basics of sustainable and Green Supply Chain Management 5.3 Green certifications and their role to support fair and green transition - Environmental Management System - Ecolabels - Life-cycle assessment (LCA) and costing (LCC) 5.4 Introduction to Green Marketing: principles and the use of available tools (ie. eco-labels)	**8**	**16**
	Project work	Using the acquired knowledge to find, select and apply for a Green public Procurement tender, the students will develop a GPP proposal. Teachers will support and assess the proposals, giving evidence of the award criteria adopted.	**4**	**12**
		Total	**48**	**86**

4. Course Duration

Based on ECVET principles, the duration of the GREENER course comprises:

- 48 contact hours of contact lessons: the amount of expected timetabled hours of trainer-trainee contact, including lectures, seminars, and workshops for

delivering the theoretical part. The lessons can be realised in presence or online synchronous

- 86 hours of Self-learning study: the GREENER course recommend a wide bibliography, and some OER. study of something by oneself without direct supervision or attendance in a class.
- Assessment

Overall, the total duration of this course amounts to 134 hours.

5. Assessment

The assessment of knowledge and skills acquired through the GREENER pathway consists of:

- 65%: with respect to the *knowledge learned and tested*. A multiple-response questionnaires is foreseen at the conclusion of each training module. The questionnaires have no performance limit, so they can be repeated until the test is passed. Upon passing all the tests on each module, the candidate can start the project work.
- 35%: with respect to the *application of the skills* to develop a project work. The project work requires the students to identify a real case of GPP call procured at the European, National or local level. Through the Project Work, the student should be able to identify all the characteristics of GPP and develop a proposal for a response to GPP consistent with the corporate mandate.

The evaluation of the PW is done by the lecturer, on a scale of:

- comprehensiveness of the technical features identified in the GPP, to increase the chances of procurement award (15/35 points)
- appropriateness of the GPP proposal to the corporate mandate, in terms of economic sustainability and feasibility of the proposal (12/35 points)
- originality of the proposal and ability to innovate the company's internal management systems (8/35 points)

The final assessment is expressed as the sum of the results achieved by the student on both tests, with a minimum level of 70/100.

6. Execution of the training

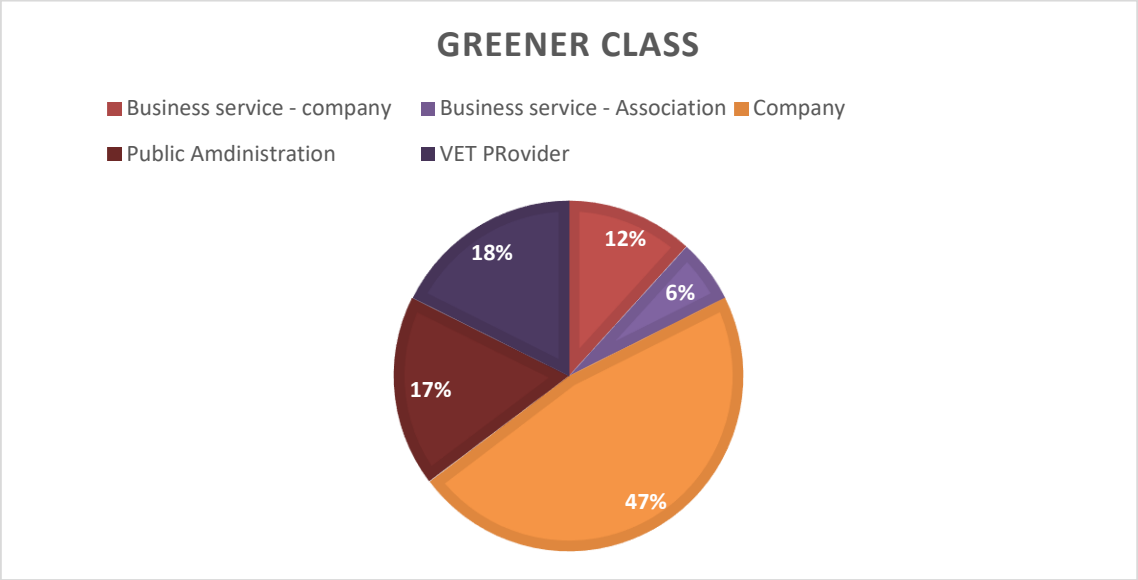
This section is developed take into consideration the highlights from the Italian pilot training session, carried out form July to October 2022, involving 17 students representing public administration and companies. The following table shows more in details the class composition.

The training session has been organized following three main phases of training:

Phase 1 – week 1

Enrolment to the training course. Subsequently to the enrollment, the participants were asked to test independently some modules of the GREENER course, starting by the Introductory module (0) "The GREENER Modular Training Course Introduction".
This step could start people to become familiar with the basic concept, share a common minimum orientation on the topic of the GPP to facilitate the interaction during the "in contact" training session.

Phase 2 – week 2



A "contact" open session should be organized. The agenda could be organized as following:

Duration (approx.)	Title	Contents
30 minutes	Welcome speech from the organiser (VET Provider and University)	The first session introduces the reasons why an SME should have the capacity to respond to GPP, and why an administrative profile should update the skills on this topic. The global and European sustainability goals scenario should be introduced.
10 minutes for each participant	Randomly presentation from the participants	The target groups represent the different interests in participating in GPP training.
20 minutes	Open discussion on previous highlights	The results should keep in evidence how sustainability is both a stimulus for social innovation and for the economic growth.
30 minutes	Presentation of the GREENER Training Path (aims, skills, field of application for SMEs)	The presentation of the GREENER training path directly shows the GREENER platform. This enables participants to familiarize with the project's e-learning platform. All modules structure were presented in summary form, emphasizing the

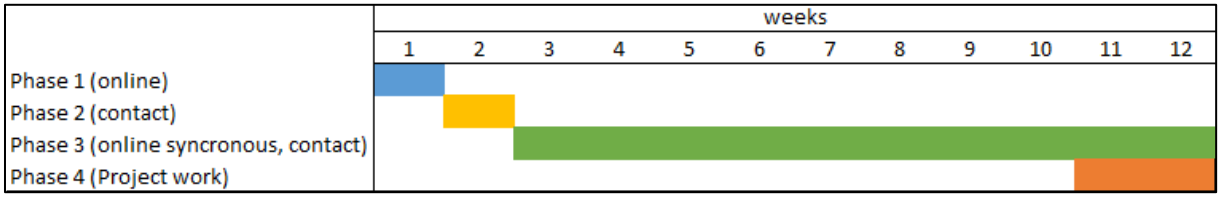
		different elements of the training offer (slides, readings, bibliography). The learning assessment tools completed the GREENER training presentation.
45 minutes	Learning by doing experience: the GPP in practice	the participants read and analyzed a real call for tenders with environmental criteria. This experience gave attendees a better understanding of what GPP is, what skills it requires to apply, and how the GREENER training path can support SMEs administrative profiles in develop and support the skills to participate in and increase the success of GPP tenders.
30 minutes	Open discussion between participants	the open discussion should allow lectures to register the participants' interest in the GPP, the readiness of many among them to attend the online training, and the request to spin off further training contents during the project work for specific production and business sectors.
Results of the meeting	Full comprehension of the GREENER training path organization, delivery modalities, main contents. Engagement of students in realizing the outcomes of the training course definition of expectations of students and the companies they represent (in terms of improving GPP participation, enhancing participation performance, etc.)	

Phase 3 and 4: from week 2 to week 12

The contact lessons: at least 4 hours per week

The Project Work: should be organised during the last 2 weeks of the training course

Individual study: is autonomously managed by the student.



Teaching material

The GPP topic relies to an extensive normative and case literature. To better manage the extensive reference literature, at the conclusion of each training module the student has a reference bibliography and webliography.

The slides already produced serve the purpose of outlining the logical sequence of knowledge the student must have to apply to a GPP.

Further in-depth exploration can be done individually, based on the suggested material in the bibliography.

An example of the GREENER training material is available attached, as well as the related test.

Requirements for the trainer's qualification

The trainer must meet the requirements for a VET trainer by the procedure established by national legal acts.

Given the GPP implication on interests of both companies and public administration, it is recommendable involve as Testimonial and Trainers profiles from the public sector (experts from public administration tender offices) as well as Experts in business services and Green Economy.

Basic knowledge of sustainability topics[9]

1. Introduction

Around 99 % of all EU businesses are SMEs, creating up to 70 % of all jobs. In general, SMEs have good growth prospects for the future and are particularly well equipped to solve environmental problems and to enhance the green economy. However, in most of the project countries, SMEs are confronted with a shortage of skilled workers and young entrepreneurs. This shortage of skilled workers is even more alarming considering that due to aging of current entrepreneurs, a large and growing number of companies will have to be handed over to the next generation. Furthermore, young specialists and entrepreneurs often lack the qualifications and skills needed to respond to contemporary developments in the fields of energy, climate, and environmental protection. The following problems have been identified in SMEs working in the fields of green economy, energy, and environmental protection:

- Blatant and growing shortage of skilled workers.
- Large qualification deficits, especially in the Green Economy.
- Loss of attractiveness and low qualification of school-based VET.
- Low rates of further training and insufficient orientation of offers to SME needs.
- Ageing of entrepreneurs and increasing shortage of young people (demographic change).
- Failure of business transfers and low rates of business start-ups.
- Low innovation rates and insufficient productivity.
- Not enough cooperation between universities and SMEs and a lack of teaching geared to SME needs.
- Comparably low internationalization of SMEs and vocational training providers.

To meet these challenges, work-based learning and new paths in vocational and further training must be provided through cooperation between educational institutions, economic chambers, and SMEs. University graduates are often well-qualified in theory,

[9] Prepared by: Wirtschaftsförderungsinstitut (WIFI) Steiermark

but lack practical knowledge, skills and abilities that are crucial for SMEs. For this reason, VET reforms must also involve higher education, and should implement dual bachelor's degree programs that combine a bachelor's degree with vocational training and on-sight work in companies.

In the 3LoE project, an innovative and complex project structure with 22 project partners from 7 countries as well as 60 associated partners from 13 countries was designed. In each country, centers of professional excellence (COEs) in Green Economy are established, managed and their permanent continuation ensured. A transnational cooperation of the centers will be developed, extended to 60 education stakeholders, and operated permanently in an institutionalized form. The centers offer a wide range of dual education measures in vocational training, further education, and higher education, that are being developed, tested, and evaluated in the project.

These educational measures on EQF levels 3-6 focus on Green Economy, Digitalization and Entrepreneurship. Furthermore, vocational, and educational consulting and innovation support for SMEs will be developed and implemented. In total, seven Train-the-Trainer programs will be developed and implemented permanently by the project partners. All results will be transferred to the 60 associated partners together with implementation advice.

As global environmental problems like climate change, environmental degradation, and resource depletion become increasingly concerning, green skills and especially the understanding of green skills are becoming crucial for all types of education. Knowledge, qualifications, and competences in green skills have emerged as critical competencies for individuals and organizations alike.

Increasingly urgent requirements in the area of environmental and social sustainability are leading to a wide range of challenges for companies and their employees. These challenges are characterized by the fact that most of them can only be met effectively and efficiently if stakeholders from a wide range of specialist and organizational areas work together. This cooperation requires a common basic understanding of a number of key objectives and concepts. Experience shows that synergies between usually unconnected roles can develop a constructive dynamic that turns supposedly burdensome obligations into a driver of innovation.

Thus, the WIFI Austria together with external experts embarked on a journey to create a modular course called "Basic knowledge of sustainability topics". The aim of this modular course is to provide anyone, regardless of their formal education or EQF Level, with basic knowledge on sustainability related topics. The course is designed in a way, that independent modules or the whole course can be taken. Furthermore, the individual modules can be integrated in existing curricula, particularly in the field of VET.

Is critical for both, current and future generations to understand the issues of climate change and to gain relevant skills. Critical not only for our own wellbeing, but also for those of future generations. The importance of green skills lies in their potential to protect and preserve the natural environment. Furthermore, the shift towards a green

economy emphasizes sustainable development and low-carbon growth, which not only increases, but also generates new green job opportunities.
Green skills encompass a broad range of abilities which are essential across various sectors. Thus, the course is designed to present the most required knowledge independently of the participant’s background. By equipping individuals with the necessary competencies, we can drive environmental innovation, support economic growth, and contribute to a more resilient and equitable world. Through a combination of theoretical knowledge and practical exercises, participants are prepared to develop and implement innovative solutions to current environmental problems. This curriculum is designed as a course that can be applied to vocational training, further training but also to university education. It is possible to start the course with relevant professional qualification or several years of a professional experience or even as someone just starting their professional education.
Thus, this curriculum demonstrates the required modules which are needed to be completed to finish the education “Green Skills - Basic knowledge of sustainability topics”. This education is not focused on a special target group, but rather to provide a holistic education relevant for climate neutrality, thus topics around energy, sustainability, management, etc. The education is designed in a way that people with different backgrounds can participate.
The topics contained in this basic modular course cover a cross-section that can serve both as a basis for successful cooperation in your own company and provide orientation for further in-depth study in the specialist modules that build on it.
After completing, participants have a general and structured perspective on sustainability in the company. In addition to an initial understanding of the key challenges and motivators on the path to a sustainable corporate culture, this includes technical, economic, regulatory and social aspects in particular.
It must be noted that legislation differs within EU countries on the entrance qualifications as well as the implementation of this curriculum. Thus, if the modules or this program is used outside of Austria certain amendments might have to take place according to national legislations.
It is however possible to use individual modules or courses and adapt then to other educations on different EQF levels. Furthermore, this curriculum is designed to be implemented after the runtime of the 3LoE project, thus changes within the individual modules and courses may apply. It is intended to incorporate this programme within the Austrian Center of Excellence, which was established during the runtime of 3LoE.

Decision-making basis for the establishment and contents

This curriculum aims to provide people, who have already gained professional experience in a business-related field - especially in small and medium-sized enterprises (SMEs) - with further knowledge, qualifications and skills in relevant topics required to support organizations and especially SMEs in tackling climate related challenges and to pave the way for achieving climate neutrality. This can be done by persons with professional experience, skilled workers, people who finished a secondary education,

finished apprentices, etc. in a non-technical field of application. It is also open for people who have less experience.
The aim of this education is to provide the participants with a theoretically sound basis for their future work that is required to support organizations in realizing sustainable strategies. They will gain and deepen knowledge and gain skills required to work in a sustainable field.

2. Executive Summary

The curriculum is designed that formally specialized and non-formally specialized persons can participate and complete the education. However, it is generally aimed at people with a professional experience working in SMEs with a high interest but not much knowledge in sustainability and environmental management.
The individual modules, which are listed further below, were developed in line with external experts as well as the consideration for required knowledge, skills, and qualifications.
The education is a program for people who aim to become new experts in sustainability and climate related topics as well as people outside of the field who wish to educate themselves and to deepen their knowledge on these topics. This course is specifically designed for people who want to support organisations in tackling the climate challenge.
The whole course consists of ten modules:

- Module I – "Introduction to sustainability"
- Module II – "Fundamentals of sustainable corporate culture"
- Module III – "Social sustainability (Social LCA)"
- Module IV – "Innovative business models with renewable energies"
- Module V – "Incentive effect and behavioral change"
- Module VI – "Climate-neutral production"
- Module VII – "Current European climate policy"
- Module VIII – "Sustainability reporting (ESG reporting)"
- Module IX – "Basics of the circular economy"
- Module X – "The basics of using data science and AI on the road to climate neutrality"

Completion of all modules results in obtaining a WIFI certificate.

Name of the course

"Green Skills - Basic Knowledge of Sustainability Topics"

Contact Details

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A-8010 Graz
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Type of the course
Vocational and educational training course

Type of Degree
Certificate of Completion

Duration of the study
The total amount of the whole programme varies according to the group size and the participants. For each module a day consisting of eight units is advised. One unit consists of 45 minutes. Thus, the whole maximum runtime is 60 hours. This excludes self-study time and preparations and research for presentations and examinations.
Note: It is recommended that the modules are offered over a period of 6 to 9 months in order to engage the participants over a longer timeframe with the subject.

Provider
Wirtschaftsförderungsinstitut der Wirtschaftskammer Österreich (WIFI) Steiermark

Economic Development Institute of the Austrian Economic Chamber (WIFI) Styria

Note to Trainers

Ideally, either the target group of a session should be precisely specified in advance, or the background of the participants should be determined to be able to adapt the content well. For example, letters of motivation from the participants can help.
The descriptions of the content are intended as a guide for the development of teaching units. The examples given are for orientation purposes and can or should be replaced or supplemented as necessary with more up-to-date examples or examples that are better suited to the composition of the participants.
Note that there are synergies and overlaps between the individual modules!

The main aim of this curriculum is to provide educational opportunities for beginners as well as professionals, in the field of sustainability to support the realization of national and international climate targets (such as the EU Green Deal, Agenda 2030, National Climate Plan, etc.), by supporting organizations in reaching climate neutrality. This course is aimed at a broad target group: it is suitable not only for existing companies and future entrepreneurs, but due to low threshold, it is also appropriate for anyone interested in sustainable business practices and innovative sustainable strategies. The main organizations addressed are SMEs. However, other types of organizations are not excluded.
The main objective is to impart knowledge in the field of sustainability and to provide a cross-section of topics that can serve both as a basis for successful implementation companies and provide orientation for further in-depth study.

3. Field of activity and qualification profile

Main Activities and Typical Functions
The main activities a person who completed this course are very extensive as well as diverse. As sustainable topics are considered a cross-sectional subject matter which

incorporates interdisciplinary aspects, participants can engage in and pursue a variety of different carriers, roles, and activities across most sectors.

The opportunities very from being employed in small and medium-sized enterprises as sustainability manager or coordinator that specialize in implementation of measures to reach set climate targets to sustainability consultant, supply chain analyst and many more.

Typical Organizations

Persons that completed this educational program are not limited in the type of organization. As new legislative regulations are emerging on national and international basis the range of possible organizations across various sectors is extensive. A basic education in sustainability topics can be applied in the following types of organizations:

- Small and medium Enterprises (SMEs)
- Large Corporations
- Consultancy Companies and Bank institutions
- Government Agencies and Departments
- Municipalities and Communities
- International Organizations
- Non-Profit and Non-Governmental Organizations
- Research and Development Institutions
- Educational Organizations

Typical Industries

As mentioned above sustainability topics are considered a cross-sectional subject matter which incorporates interdisciplinary aspects. Thus, participants can engage in and pursue a variety of different carriers, roles, and activities across most industry sectors.

Qualifications and Competences

All learning outcomes of this education program can be included in various competence levels according to the EQF. Thus, it is not limited to any level. However, If the whole course as it is presented in this curriculum is completed it corresponds to an education on EQF Level 5.

"The GreenComp: the European sustainability competence framework of the European Commission" has been considered while creating this curriculum, as it provides a common ground to learners and guidance to educators, advancing a consensual definition of what sustainability as a competence entails. Furthermore, it responds to the growing need for people to improve and develop the knowledge, skills and attitudes to live, work and act in a sustainable manner. Thus it perfectly fits this curriculum. It is also designed to support education and training programmes for lifelong learning and is written for all learners, irrespective of their age and their education level and in any learning setting – formal, non-formal and informal. This, again, underlines the importance of the framework.

The individual qualifications and competences can be found in the individual Modules shown in chapter 5.

Description of the Curriculum

The modules of the curriculum …

Module I	“Introduction to Sustainability”
Module II	“Fundamentals of sustainable corporate culture”
Module III	“Social sustainability (Social LCA)”
Module IV	“Innovative business models with renewable energies”
Module V	“Incentive effect and behavioral change”
Module VI	“Climate-neutral production”
Module VII	“Current European climate policy”
Module VIII	“Sustainability reporting (ESG reporting)”
Module IX	“Basics of the circular economy”
Module X	“The basics of using data science and AI on the road to climate neutrality”

…are defined and standardized. Participation (of at least 75 %) in all courses is required to be eligible to take the examinations. All modules are characterized by theoretical lecture contents, participation, group work, and independent self-study work.
Which assessment methods apply is depended on the module. The usual method of assessment consists of coursework, assignments, presentations, and examinations. Attendance and participation contribute to the course grade.
The overall grade is calculated via the average module grades. All modules taken together result in a final grade.

Module contents

Module I provides an overview of the process and topics of the course “Green Skills - Basic Knowledge of Sustainability Topics”, as well as an introduction to sustainability.
Module II conveys the key challenges and motivators for a sustainable corporate culture and the critical assessment of sustainability narratives.
Module III provides a basic understanding of how to assess social sustainability based on different dimensions for the company and identify opportunities for improvement.
Module IV teaches the ability to recognize potential revenue streams in the field of renewable energy and to make a rough estimate of the economic benefits and costs.
Module V provides a basic understanding of which motives for action are decisive in which situation and in which target group and how these motives can be specifically addressed through interventions.
Module VI provides an overview of the most important terms and concepts in the context of production and the ability to outline initial ideas for climate-neutral production in your own company.
Module VII teaches the basics of finding information on new legislation and assessing the impact on your own company.
Module VIII teaches the basic ability to communicate in one's own company which requirements are specifically relevant and which challenges arise for the company as a result.

Module XI teaches the basic ability to outline possible strategies for the role of one's own company in the circular economy and to assess the consequences at operational and strategic level.

Module X provides participants with the ability to fundamentally describe the opportunities and challenges for the use of data science and AI for sustainability based on use cases in their own company and to make initial cost/benefit considerations.

Module I "Introduction to Sustainability"

Module title: "Introduction to Sustainability"	
Module Number: 1	**Scope**: 8 teaching units (6 hours)
Subject Area:	Sustainability and Environment
Target Group:	In addition to people from the management/executive board of companies, the target group includes sustainability, energy and CSR officers as well as people in general in roles with current or future relevance to sustainability issues.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	The introductory unit is at the beginning of the series and therefore contains an introduction block: • Introduction of Participants • Participants introduce their company and service or product. • Presentation of all topics of the modules • Presentation of speakers and trainers • Module schedule Specialized introductory block: Terminology: - Develop a basic understanding using common terms: e.g. climate neutrality, carbon footprint, circular economy, SDGs, ESGs, scopes - Climate and energy targets - Step by step towards a climate-neutral/sustainable company Fields of action: Energy, mobility (e.g. logistics of raw materials and products, employee mobility, customers), recycling/circular economy, supply chains, buildings, product development, new business models, procurement, financing, social responsibility, reporting Competences and Qualifications: -Understanding basic sustainability concepts, principles, and terminology -Gain a foundational understanding of sustainability concepts and principles. -Learn about the major environmental, social, and economic challenges facing the world today. -Understand the United Nations' SDGs and their importance in global sustainability efforts.

	-Understanding complex sustainable systems and the inter-connections between different components of sustainability. -Understanding sustainable terminology The introductory unit provides an overview of the whole course and explains the most important terms and topics that are subsequently covered in the individual units. After completing this unit, participants have the necessary foundation to be able to complete the other modules.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of sustainability. …develop informed opinions on sustainability issues.
Recommended literature	"Sustainability: A Comprehensive Foundation" by Theis T. and Tomkin J. "Our Common Future" by the World Commission on Environment and Development (Brundtland Report)
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination.

Module II "Fundamentals of sustainable corporate culture"

Module title: "Fundamentals of sustainable corporate culture"	
Module Number: 2	**Scope**: 8 teaching units (6 hours)
Subject Area:	Sustainability, Environment, Corporate Culture
Target Group:	The target group includes positions such as sustainability or CSR officers, recruiters and managers at all levels. The module is also suitable for people involved in topics such as organizational development and employer branding.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	The module contains the following content, which is intended to take into account the current state of development in terms of sustainable corporate culture. <u>Corporate culture and its environment:</u> • Basic understanding of the use of common heuristics (e.g. "Energy Cultures", "Collective Memory") • Examples of frameworks from organizational development that can provide guidance in establishing a sustainable corporate culture <u>Awareness – simplicity – impact:</u> • "Attitude-Action Gap" and "Behavior-Impact Gap" • "Low-cost" hypothesis • Green Signaling

	• Inconsistencies between communication and visible action • Costs and relative magnitudes of common measures Sustainability strategy and employer branding (interactive part) • Assessing self-image and external image of the company • Group exercise: sustainable employer branding • Discussion: Employee Lifestyle – private vs. professional Qualifications and Competences: -Understanding corporate culture and its drivers -Understanding how corporate culture influences behavior -Understanding the relevant terminology -Understand the importance of corporate responsibility in sustainability. -Learn about implementing sustainable practices within an organization. -Gain insights into how to foster a sustainable corporate culture. After completing the course, participants should be able to fundamentally describe the most important challenges on the way to a sustainable corporate culture in their own company. They should be familiar with internal and external motivators for a sustainable corporate culture and be able to discuss their possible role for their own use cases. In addition, they should be able to critically assess the sustainability narrative in their own company and identify opportunities for improvement.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of corporate culture. …develop and share informed opinions on the importance of corporate culture.
Recommended literature	"Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage" by Esty D.C. and Winston A.S. "The Sustainable MBA: A Business Guide to Sustainability" by Weybrecht G.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module III "Social Sustainability (Social LCA)"

Module title: "Social Sustainability (Social LCA)"	
Module Number: 3	**Scope**: 8 teaching units (6 hours)

Subject Area:	Social Sustainability, Life-Cycle-Analysis
Target Group:	The target group includes representatives from small and medium-sized enterprises in all sectors who are interested in a better understanding of social sustainability, who want to be sensitized to it and who want to improve it in their own company.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	This module includes the following content, which is intended to create a basic understanding of the topic and convey its business relevance. <u>Definition of social sustainability (including discussion):</u> • Definitions of social sustainability are presented; their respective focuses and differences are discussed and finally the group agrees on its own definition. • Alternative: Participants prepare their own definitions of social sustainability before the event (based on internet research) which are then discussed. <u>Relevance of social sustainability for an organization:</u> • Ethical responsibility: Contribution to society • Benefits for the company itself: Sales argument, higher productivity through more satisfied employees, etc. • Legal/regulatory obligations: e.g.: Anti-discrimination law, employee protection, ESG reporting, supply chain law <u>Sustainability strategy and employer branding (interactive part)</u> • Assessing self-image and external image of the company • Group exercise: sustainable employer branding • Discussion: Employee Lifestyle – private vs. professional <u>Concepts of social sustainability:</u> Sustainable Development Goals (SDGs): What are they and what dimensions do they cover? Which dimensions are particularly relevant for certain companies? Which are less so? Social lifecycle assessment: method, stakeholders covered and dimensions <u>Qualifications and Competences:</u> -Understand the methodology and importance of Social LCA. -Learn how business activities impact social aspects like labor rights, community development, and human rights. -Understand the importance of engaging stakeholders in social sustainability. After completing the module, participants are sensitized to the topic of social sustainability, they are able to assess social sustainability in various dimensions for their company and develop possible suggestions for improvement.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to…

	…understand and explain key concepts and principles of social sustainability. …develop and share informed opinions on the importance of social sustainability.
Recommended literature	"Social Life Cycle Assessment: An Insight" by Traverso M. "Social Responsibility and Environmental Sustainability in Business: How Organizations Handle Profits and Social Duties" by Banerjee P.M. and Hill V.E.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module IV "Innovative Business Models with Renewable Energies"

Module title: "Innovative Business Models with Renewable Energies"	
Module Number: 4	**Scope**: 8 teaching units (6 hours)
Subject Area:	Business Models, Renewable Energy
Target Group:	The target group includes representatives from small and medium-sized enterprises from all sectors who are interested in gaining insights into the revenue streams of renewable energies for their company.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	This module includes the following content to provide an insight into the current opportunities for innovative business models in the field of renewable energies. <u>Background business models for renewable energy:</u> • Higher share of renewables brings challenges for the current electricity grid but also new opportunities in the value chain (storage solutions, power-to-X, V2G solutions) • Examples of the cost efficiency of various technologies (PV, heat pumps, storage, wind refurbishment) and technology combinations • Overview of funding opportunities for individual technologies and technology combinations at national and regional level • Best practice examples of innovative business models in the field of renewable energy <u>Basics of energy communities:</u> • Production, storage, consumption, and sale of energy across property boundaries. • Overview of how and in what role SMEs can participate in energy communities. • Economic, environmental and social benefits for participants

	• What data do I need to participate in an energy community and how do I obtain it? Calculation of savings through participation in an energy community in your own company Outlook for business models: • Use of local flexibilities • Internal optimization (use of flexible tariffs, increased self-consumption) • External optimization (sale of flexibility on markets) • Opportunities for heat sharing with surrounding companies and households Qualifications and Competences: - Gain knowledge about different renewable energy sources and technologies. -Learn how to create and implement innovative business models that leverage renewable energies. -Understand the economic advantages of adopting renewable energy solutions. After completing the module, participants will be able to recognize potential revenue streams in the field of renewable energy and give a rough estimate of the economic benefits, costs and effort involved for their company.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of innovative business models. …develop and share informed opinions on the importance of renewable energy.
Recommended literature	"Renewable Energy: A First Course" by Ehrlich R. "The Business of Sustainability: Trends, Policies, Practices, and Stories of Success" by Steger U.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module V "Incentive Effect and Behavioral Change"

Module title: "Incentive Effect and Behavioral Change"	
Module Number: 5	**Scope**: 8 teaching units (6 hours)
Subject Area:	Incentive Effects, Behaviour
Target Group:	The target group includes representatives from small and medium-sized enterprises in all sectors who want to promote sustainable behavior among their employees or, if in the service sector, want to motivate their customers to adopt sustainable behavior as part of their marketing or customer

	relationship management. With a very wide range of participants, individual teaching elements can be worked on in small groups from the same sector.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	This module includes the following content in order to impart knowledge based on environmental psychology and behavioral economics: Target group definition (keynote speech, stakeholder mapping, characterization of personas): • Narrowing down the intended target audience of behavior-changing interventions that the participants want to implement: Definition of the target group, initial situation/needs/leverage points Multicausality of sustainable behavior • Psychological theories of action: Differentiation of motives for everyday consumption versus strategic investment decisions, stage model of behavior change. Intervention techniques: • Formats and techniques for changing behavior: nudging, action-oriented feedback, establishing and visualizing social expectations, communicating personal benefits versus renunciation, breaking habits, avoiding rebound effects and maladaptation, concrete starting points in the company (e.g. company mobility management, canteen food) Design of an intervention in your own company • Detailed planning of an intervention that the participants can and want to implement in their practical environment: Definition of the behavior to be changed, justification of the motives for action addressed, selection and implementation of the intervention technique, assessment of effectiveness, methods for independent evaluation and outcome monitoring. Qualifications and Competences: -Understand the principles of behavioral economics related to sustainability. -Learn about designing and implementing incentives to promote sustainable behaviors. -Gain insights into effective strategies for encouraging behavioral change towards sustainability. After completing the module, participants will be able to select, implement and evaluate interventions to change behavior in their own company. They will have acquired a basic understanding of which motives for action are decisive in which situation and in which target group and will be able to address these motives specifically through interventions.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to…

	…understand and explain key concepts and principles of behaviour and behaviour change. …develop and share informed opinions on the importance of Incentive techniques.
Recommended literature	"Nudge: Improving Decisions About Health, Wealth, and Happiness" by Thaler R.H. and Sunstein C.R. "The Behavioural Insights Team: Update Report 2015-16"
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module VI "Climate-neutral Production"

Module title: "Climate-neutral Procduction"	
Module Number: 6	**Scope**: 8 teaching units (6 hours)
Subject Area:	Climate Neutrality, Production
Target Group:	In addition to people from the management and executive boards of companies, the target group includes sustainability, energy and CSR officers, as well as people with roles in and around production.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	This module includes the following content in order to develop a basic understanding of the opportunities and challenges on the way to climate-neutral production: <u>Conceptual framework:</u> • Differentiation between product and organizational perspective • Understanding different fields of action, e.g. energy, mobility, circular economy, reporting, employee motivation, etc. <u>Strategic aspects:</u> • Corporate strategy as context • Decarbonization and the circular economy • Opportunities and challenges along the value chain • Definition and requirements of product development and eco-design • Cooperation between companies: Peer-to-peer learning, networks. <u>Regulation and financing:</u> • ESG reports/data collection in the context of production • Financing/subsidies/taxonomy • New business models, explanation and examples <u>Qualifications and Competences:</u>

	-Learn methods for reducing the carbon footprint of production processes. -Understand sustainable manufacturing practices and their benefits. -Gain knowledge on developing and implementing strategies for climate-neutral production. After completing the course, participants know the most important terms such as decarbonization, circular economy or taxonomy and can independently develop initial ideas on what climate-neutral production could look like in their own company.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of climate-neutral production.
Recommended literature	"Design for Environment: A Guide to Sustainable Product Development" by Fiksel J. "Sustainable Manufacturing: Challenges, Solutions, and Implementation Perspectives" Stark R., Seliger G., and Bonvoisin J.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module VII "Current European Climate Policy"

Module title: "Current European Climate Policy"	
Module Number: 7	**Scope**: 8 teaching units (6 hours)
Subject Area:	Climate Policy
Target Group:	The target group includes representatives from small and medium-sized enterprises from all sectors who are interested in gaining insights into current European climate policy legislation.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	This module includes the following content to provide a basic understanding of European climate policy and its impact on regional companies: <u>Process Legislation:</u> • Overview of the roles of various bodies (European Council/Commission) • Implementation of European laws at national and regional level <u>EU Clean Energy Package:</u> current laws, e.g:

	• Electricity Market Directive • Electricity Trading Regulation • Electricity Market Directive • New Buildings Directive. <u>Effects on companies:</u> • Gathering information (e.g. Green Transformation Map) • Assessment of the relevant laws and the timeline for implementation for my company using a checklist • Exercise: Searching for and interpreting relevant laws for your own company <u>Qualifications and Competences:</u> -Understand the current climate policies and regulations in the European Union. -Learn about the implications of these policies for businesses and industries. -Gain insights into how organizations can comply with and adapt to these policies. After completing the module, participants will be able to find information on new legislation and assess the impact on their own company.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of current environmental and climate policies. …develop and share informed opinions on the importance of international environmental legislation.
Recommended literature	"The European Union's Climate Change Policy: An Introduction and Overview" by Boasson E.L. and Wettestad J "Climate Policy Integration into EU Energy Policy: Progress and Prospects" by Dupont C.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module VIII "Sustainability Reporting (ESG Reporting)"

Module title: "Sustainability Reporting (ESG Reporting)"	
Module Number: 8	**Scope**: 8 teaching units (6 hours)
Subject Area:	Sustainability Reporting, ESG
Target Group:	People who work in SMEs and are indirectly affected by the reporting obligations. This includes, for example, suppliers to larger companies from which sustainability-related data is requested.

Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	This module includes the following content to provide a basic understanding of sustainability reporting and its impact on regional companies: <u>Legal framework:</u> • Company level: Green Deal, taxonomy, CSRD, CSDDD • Product level: ESPR (Ecodesign Regulation), sector-specific regulations (e.g. batteries/building products/packaging) • Consumer protection, e.g. ECGTD/Green Claims Directive • Interaction of legal frameworks • Synergies with management systems (ISO 9001, 14001, etc.) <u>Implementation CSRD:</u> • Life cycle perspective • Materiality analysis, in particular analysis of the value chain/stakeholder process • GHG accounting and climate literacy (scopes, conversion factors, open source sources/references) • Estimation of the time required and support for implementation <u>Potential for companies:</u> • Impact on individual departments of organizations • Good practice examples (reflection on ESG reports or documents in small groups) • Do's and don'ts • Greenwashing • Effective measures • Innovation of the business model <u>Qualifications and Competences:</u> -Understand the standards and frameworks for Environmental, Social, and Governance (ESG) reporting. -Learn how to prepare and present sustainability reports. -Gain skills in effectively communicating sustainability efforts to stakeholders through reporting After completing the module, participants will be able to name the objectives of EU legislation in the area of ESG reporting. Furthermore, they will be able to explain the relationships between the various legal acts (EU taxonomy, CSRD, ESRS, CSDDD) in an overview. They also have knowledge of the most important technical terms in the ESG area. The aim is for participants to be able to communicate in their companies which requirements are relevant for the respective companies and how they can prepare for them.

Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of ESG Reporting. …develop and share informed opinions on the importance of environmental reporting in regards of climate change.
Recommended literature	"Sustainability Reporting and Communications" by White G.B. and Beu D. L. S. "The Triple Bottom Line: How Today's Best-Run Companies Are Achieving Economic, Social, and Environmental Success - and How You Can Too" by Savitz A. W.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module IX "Basics of the Circular Economy"

Module title: "Basics of the Circular Economy"	
Module Number: 9	**Scope**: 8 teaching units (6 hours)
Subject Area:	Circular Economy
Target Group:	The target group includes representatives from small and medium-sized enterprises in all sectors who are interested in learning more about the concept of the circular economy and implementing it in their company.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	This module contains the following content, which is intended to convey the basic concepts of the circular economy as well as the opportunities and challenges for your own company: <u>Introduction:</u> Basis of the circular economy: • Various definitions and what they mean for implementation in the company. • Definitions from various standards and strategies. • Who wants it and why? => the EU strategies, AUT strategy • What is "waste": Waste, wastage, bound resources - the concept of utilization intensity Strategies for the circular economy and their integration into the corporate strategy: • R strategies • Different levels: Technical measures, business model, consumer behavior • Examples from the production sector • Examples from the construction sector

	• Examples in the context of services (tourism, retail, logistics) Implementing the strategy in the company • Company and product level (PDCA circle) • Synergies with other companies within and outside the supply chain • Sharing of information Circular economy and sustainability • Is a circular economy always more sustainable than a linear economy? • Which environmental issues are important to the company? • How can sustainability and circularity be assessed? • The role of the circular economy in ESG reports (ESRS-CSDDD) • Social and economic impacts of the circular economy <u>Opportunities and risks of the circular economy:</u> • Challenges posed by standards and laws (end of waste, rental models and liability, continued operation of older machines) • Financing (EU taxonomy, subsidies, banks and investors) • Cooperation and data exchange between companies • Opportunities for innovation <u>Qualifications and Competences:</u> -Understand the principles and concepts of the circular economy. -Learn about strategies for maximizing resource efficiency and minimizing waste. -Gain knowledge on developing business models that support a circular economy. After completing the module, participants will be able to outline possible strategies for their own company's role in the circular economy and assess the consequences at an operational and strategic level. They will be able to recognize synergies with other aspects of sustainability and assess risks and opportunities for their own company.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of a circular economy. …develop and share informed opinions on the importance of circular economy for companies.
Recommended literature	"Waste to Wealth: The Circular Economy Advantage" by Lacy P. and Rutqvist J. "Circular Economy: A User's Guide" by Stahel W. R

Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Module X "Basics of Using Data Science and AI on the Road to Climate Neutrality"

Module title: "Basics of Using Data Science and AI on the Road to Climate Neutrality"	
Module Number: 10	**Scope**: 8 teaching units (6 hours)
Subject Area:	Data Science, AI, Climate Neutrality
Target Group:	The target group includes roles such as sustainability or CSR officers, controllers and analysts. The module is also suitable for managers in strategic functions who decide on the future use of data-driven solutions as part of their company's sustainability strategy.
Mode of Delivery	Integrated Course (lecture, case studies, exercises, self-study)
Key Module Contents	The thematic block contains the following content, which is intended to take into account the current state of development in the field of data science and AI: <u>Technical background:</u> • Common definitions of "data science" and "AI" and their similarities and differences • Basic technical stages from the database to the finished data science or AI solution for your own company (e.g. using the data science "hierarchy of needs") • Examples of the limits of data science and AI on the path to climate neutrality (e.g. critical cases of energy requirements vs. benefits) <u>Application in the company:</u> • Overview of the currently most common fields of application of data science and AI in the area of sustainability reports and analyses • Examples of how current tools can support creativity using generative AI and the extent to which "generative" and "creative" differ • Examples of the use of AI as a "neutral authority" (e.g. when comparing sustainability reports) • Examples of challenges in the area of data quality (e.g. based on the quality criteria of validity, reliability and objectivity) • Organizational and cultural requirements for data-driven decision making (e.g. traceability vs. data-driven solution as a black box)

	• Know the challenges in the context of "green & digital skills" in recruiting (e.g. requirements in the areas of interdisciplinarity and communication) Qualifications and Competences: -Understand the basics of data science and its application in sustainability. -Learn how artificial intelligence can be used to develop solutions for climate neutrality. -Gain skills in using data analytics to inform sustainability strategies and decisions. After completing the course, participants should be able to fundamentally describe the opportunities and challenges for the use of data science and AI for sustainability based on use cases in their own company. In particular, they should be able to make initial cost/benefit considerations for their own use cases, e.g. in order to be able to fundamentally assess offers from service companies.
Learning outcomes of the Course Unit	Upon positive completion of the course, participants will be able to… …understand and explain key concepts and principles of Data Science in an environmental context. …develop and share informed opinions on the importance of data science and AI in tackling climate change.
Recommended literature	"Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking" by Provost F. and Fawcett T. "Artificial Intelligence and Climate Change: Opportunities, Challenges, and Initiatives" by Kreutzmann A. and Cartsburg K.
Planned learning activities and teaching methods	Didactic and methodological design: - Lecture and discussion - Presentation - Assignments - Discussion
Assessment methods and criteria:	Written final examination or presentation.

Animal welfare for a better future[10]

1. Introduction

Period of implementation: December 2023 – June 2024

[10] Prepared by Marco Ingrossi and Marco Cifoni, ITA Emilio Sereni, Italy

The ethical treatment of animals and the promotion of their well-being have become increasingly significant topics in today's society. The concept of animal welfare encompasses a wide range of issues, from the conditions in which animals are housed and cared for, to the ethical considerations of their use in various industries such as farming, research, and entertainment. As awareness grows about the sentience and intrinsic value of animals, there is a concurrent rise in the demand for improved standards and practices to ensure their welfare.

This report, titled "Animal Welfare for a Better Future," aims to explore the multifaceted dimensions of animal welfare, highlighting its importance not only for the animals themselves but also for society at large. Through a comprehensive examination of current practices, ethical frameworks, and legal regulations, this report seeks to provide a thorough understanding of the current state of animal welfare and to propose actionable recommendations for future improvements.

Animal welfare is a critical issue that affects not only the animals but also the environment, public health, and social ethics. Improved animal welfare can lead to better public health outcomes, as well-cared-for animals are less likely to carry diseases that can be transmitted to humans. Additionally, ethical treatment of animals aligns with societal values of compassion and justice, fostering a more humane and conscientious community.

The course is offered to students of the fourth-year classes. However, students from other classes and teachers from the Agricultural Technical Institute “Emilio Sereni” were welcome to participate in the course. It was open to anyone interested in exploring the state of the art and future possibilities regarding the use of Animal Welfare. 16 students attended the curse.

2. Execution of the training

The objective of the course was to provide a comprehensive understanding of the potential applications of Animal Welfare. This was achieved through a blended learning approach, integrating online and face-to-face lectures and practical exercises.

The practical exercises constituted a pivotal element of the course, affording students the opportunity to engage in data acquisition missions at the Emilio Sereni Agricultural Technical Institute and subsequently process the data obtained.

The objective of the course was to equip participants with the requisite skills to implement precision farming technologies, with a particular focus on the utilisation of Animal Welfare techniques within the framework of a farm's management system.

Subsequently, the students were invited to complete a feedback questionnaire pertaining to the teaching methods and content. They expressed a high level of satisfaction with the course, commending the comprehensive curriculum and the practical, hands-on approach to learning about drones in agriculture.

3. Curriculum

Learning outcomes related to the educational, cultural, and professional profile in the course can be identified as:

- Knowing the main animal welfare indicators;
- Knowing the EU guidelines on animal welfare;
- Identify from a description of a barn and/or animal behavior the main issues related to animal welfare and safe working conditions.
- Knowing the difference between Classy Farm and the official animal welfare checklist

The program has been divided into seven MODULES. For each module, the Learning Teaching Units have been allocated (hereinafter referred to as UDA).

MODULE 1: Introduction to animal protection and welfare	
Training Objectives	Approach to discipline
	Acquisition of awareness in considering the animal fundamental from the point of view of the environmental ecosystem, but also cultural, as a subject and holder of rights as a sentient being.
	Acquiring the awareness that promoting good health in order to best express specific productive potential.
Specific Learning Objectives	To adopt an approach to animal welfare that truly values the human-animal relationship
	To promote an animal welfare culture in step with the times
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realization of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: Course presentation and introduction to animal welfare issues
	UDA 2: Walther's Triangle and its productive benefits
	UDA 3: The 5 freedoms/needs of animals
	UDA 4: Mental wellbeing, physical and behavioral wellbeing
Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 2: Animal Welfare Basics and Principles	
Training Objectives	Acquisition of awareness of how the safety of the food chain is directly linked to animal welfare
Specific Learning Objectives	Knowing the EU and national legislative framework on animal welfare
	To learn how important it is to promote animal friendly production systems that indicate the level of animal friendliness of a product
	Knowing the main indicators for assessing animal welfare
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Lectures
	Creation of working groups
	Laboratory and research lessons
	Realization of the task/product
	Verification of skills and objectives through presentation and display of the final product
Contents	UDA 1: Main EU and national legislation on animal welfare
	UDA 2: Main certification and labelling dedicated exclusively to improving animal welfare
	UDA 3: Animal welfare monitoring
Methods	Lectures and dialogues through the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 3: Well-being assessment	
Training Objectives	Knowing the main natural (microclimate) and anthropic (structures) factors that interact on the psychophysical, metabolic, behavioral and productive aspects of animals
Specific Learning Objectives	Knowledge of the main types of breeding (wild - semi-wild - stallion)
	Guide to reading and analysing the Ministry of Health Check list for B.A. assessment
	To know the main differences between the official Check -list and the self-assessment through the ClassyFarm platform
	To know the main management and structural parameters responsible for the stress caused to the animals
	To know the set of logistical-managerial and behavioral measures to reduce or eliminate the risk of introduction, development and spread of diseases within the herd
Phased Sequence	Preparation and research of material by the teacher.
	Presentation of the teaching unit to the class, using multimedia presentation
	Lectures
	Creation of working groups

	Laboratory and research lessons
	Realization of the task/product
	Verification of skills and objectives through presentation and display of the final product
Contents	UDA 1: Welfare and husbandry environment and types of housing
	UDA 2: Welfare assessment (Check list)
	UDA 3: Voluntary self-control (ClassyFarm)
	UDA 4: Welfare diagnosis
	UDA 5: Biosecurity and controls in animal husbandry
Methods	Lectures and dialogues through the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

Course duration

The duration of the INSIGHT course is estimated in 150 hours, comprises:

- Study hours → the time needed to read the training materials;
- Self-study hours → the time needed to understand the training materials and to read additional materials;
- Contact hours → questions launched in specific forums and interaction with other students;
- Practical exercises → required sessions of practice;
- Self-assessment → the time needed to prepare the assessment and execute it;
- Research and preparation of materials.

Additionally, another 52 hours were dedicated to dissemination.

4 Assessment

At the end of each instructional module, an evaluation test was administered. This test served a dual purpose: for the instructor, it was a tool to identify any gaps in teaching, ensuring that the course content was being effectively communicated and understood. For the students, it was an opportunity to assess their own level of preparation and understanding of the material covered. These tests were designed to be comprehensive, covering all the key concepts and techniques discussed in the module.

The results of these evaluations were carefully analysed by the instructor. If common areas of difficulty were identified, additional resources and support were provided to address these issues. This feedback loop ensured that the course remained adaptive and responsive to the needs of the students, continuously improving in quality and effectiveness.

For the students, these assessments were valuable milestones in their learning journey. By reflecting on their performance, they could identify strengths and areas for improvement, guiding their study efforts more effectively. The tests also served to reinforce the material, helping students to retain information and build a solid foundation of knowledge.

The course also incorporated practical activities in the use of the Animal Welfare for a better Future. Practical lessons were essential to apply theoretical knowledge to real scenarios, reinforcing learning and promoting essential skills.

The “Animal Welfare for a better Future” training materials is uploaded and available on the classroom platform.

The lecturers provided various resources to deepen the students' understanding of the subject. These included textbooks for further reading, PowerPoint summaries, and PDF documents. Additionally, the results of tutorials and practical exercises are visible on the same platform.

Use of drones in agriculture[11]

1. Introduction

Period of implementation: December 2023 – June 2024

The advent of drone technology has revolutionized various sectors, with agriculture being one of the most significantly impacted. The incorporation of drones into agricultural practices offers a myriad of possibilities and advantages, facilitating more efficient, precise, and sustainable farming. One of the most prominent applications of drones in agriculture is in the realm of precision agriculture. Precision agriculture involves the use of technology to monitor and manage field variability in crops. Drones equipped with advanced sensors and imaging capabilities can collect high-resolution data, providing farmers with detailed insights into their fields. This data can include information on crop health, soil conditions, moisture levels, and pest infestations. In addition, drones equipped with spraying systems can apply agrochemicals evenly and accurately. This method reduces the exposure of workers to harmful chemicals and ensures that the chemicals are applied only where needed. Drones can operate in difficult terrain and access areas that may be challenging for ground-based equipment. Drones can also contribute to environmental monitoring and conservation efforts in agriculture. They can assess the impact of farming practices on the environment and help implement sustainable practices.

While the benefits of drones in agriculture are substantial, there are also challenges that need to be addressed. Regulatory issues, high initial costs, and the need for technical expertise are some of the barriers to widespread adoption. However, as technology advances and becomes more affordable, the use of drones in agriculture is expected to grow.

The course is offered to students of the fourth-year classes. However, students from other classes and teachers from the Agricultural Technical Institute "Emilio Sereni" were welcome to participate in the course. It was open to anyone interested in exploring the state of the art and future possibilities regarding the use of Unmanned Aircraft Systems (UAS) in agriculture. 14 students and 5 teachers attended the course.

2. Execution of the training

The objective of the course was to provide a comprehensive understanding of the potential applications of drones in the agricultural sector. This was achieved through a blended learning approach, integrating online and face-to-face lectures and practical exercises.

[11] Prepared by Leonardo Assetatti and Eros Caputi, Univeristy of Tuscia, Italy

The course covered a range of topics related to the use of drones in agriculture, including technical aspects of drone operations, the various potential applications in the agricultural sector, and the acquisition and processing of data. In particular, the course placed a significant emphasis on the utilisation of software for the management of georeferenced data obtained from drones. The practical exercises constituted a pivotal element of the course, affording students the opportunity to engage in data acquisition missions at the Agricultural Technical Institute "Emilio Sereni" and subsequently process the data obtained.

Main findings and conclusions

The objective of the course was to equip participants with the requisite skills to implement precision farming technologies, with a particular focus on the utilisation of UAS within the framework of a farm's management system.
Subsequently, the students were invited to complete a feedback questionnaire pertaining to the teaching methods and content. They expressed a high level of satisfaction with the course, commending the comprehensive curriculum and the practical, hands-on approach to learning about drones in agriculture.

3. Curriculum

Learning outcomes related to the educational, cultural, and professional profile in the course of study can be identified as:

- Understanding the main technologies of use of drones in agriculture.
- Knowing how to perform a data collection mission from UAS-mounted sensors.
- Knowing how to handle georeferenced data on GIS software
- Being able to present the knowledge acquired.

The program has been divided into seven MODULES. For each module, the Learning Teaching Units have been allocated (hereinafter referred to as UDA).

MODULE 1: Introduction and technological characteristics of drones	
Training Objectives	Approach to discipline
	Acquisition of awareness of the educational value of the discipline in the construction of one's professional profile
Targeted Skills	Proficiency in the expressive tools (oral and written) of the discipline to manage communicative interaction.
Specific Learning Objectives	Learning the physical principles behind the operation of drones involving mechanics and electrical engineering
	Knowing the physical components of drones and being able to make a choice according to use
Phased Sequence	Preparation and research of material by lecturers and learners.
	Presentation of the teaching unit to the class, using textbook, magazines
	Lectures
	Carrying out homework and assignments
	Verification of skills and objectives through presentation and display of final product

	Remedial
Contents	UDA 1: Historical evolution of drones
	UDA 2: Basic physics for drones
	UDA 3: Functional classification of drones
	UDA 4: Fundamental components of drones
Methods	Lectures and dialogues through the functional-communicative approach
	Multiple-choice tests
MODULE 2: Sensors, electronics and automatic drone control	
Training Objectives	Approach to discipline
	Acquisition of awareness of the educational value of the discipline in the construction of one's professional profile
Targeted Skills	Proficiency in the expressive tools (oral and written) of the discipline to manage communicative interaction.
Specific Learning Objectives	Understanding the functioning of sensors and accessory electronics of drones
	Learning the basics of electronics and programming useful for acquiring data via sensors
	Knowledge of global navigation satellite systems
	Knowledge of autonomous flight methods
Phased Sequence	Preparation and research of material by lecturers and learners.
	Presentation of the teaching unit to the class, using textbook, magazines
	Lectures
	Creation of working groups for the realization of a project
	Verification of skills and objectives through presentation and display of final product
	Remedial
Contents	UDA 1: Sensors and accessory components
	UDA 2: Basics of electronics and programming
	UDA 3: GNSS and RTK systems
	UDA 4: Autonomous flight and navigation via waypoints
Methods	Lectures and dialogues through the functional-communicative approach
	Using the Tinkercad site for prototyping
	Multiple-choice tests
MODULE 3: Legislation and regulation of drones	
Training Objectives	Approach to discipline
	Acquisition of awareness of the educational value of the discipline in the construction of one's professional profile
Targeted Skills	Proficiency in the expressive tools (oral and written) of the discipline to manage communicative interaction.
Specific Learning Objectives	Know the main regulations governing the use of drones
	Use of services provided by the institutions
Phased Sequence	Preparation and research of material by lecturers and learners.
	Presentation of the teaching unit to the class, using textbook, magazines
	Lectures
	Creation of working groups for the realization of a project

	Verification of skills and objectives through presentation and display of final product
	Remedial
Contents	UDA 1: Aviation safety and regulation
	UDA 2: Airspace restrictions
	UDA 3: Operating procedures, privacy and insurance
Methods	Lectures and dialogues through the functional-communicative approach
	Multiple-choice tests
MODULE 4: Applied drone systems for precision agriculture	
Training Objectives	Approach to discipline
	Acquisition of awareness of the educational value of the discipline in the construction of one's professional profile
Targeted Skills	Proficiency in the expressive tools (oral and written) of the discipline to manage communicative interaction.
Specific Learning Objectives	Basics of precision agriculture
	Application of precision agriculture through drones
Phased Sequence	Preparation and research of material by lecturers and learners.
	Presentation of the teaching unit to the class, using textbook, magazines
	Lectures
	Creation of working groups for the realization of a project
	Verification of skills and objectives through presentation and display of final product
	Remedial
Contents	UDA 1: Definition of precision agriculture
	UDA 2: Electromagnetic spectrum and sensors for detecting vegetation indices
	UDA 3: LiDAR sensors, radar, cameras and sterocameras
Methods	Lectures and dialogues through the functional-communicative approach
	Multiple-choice tests
MODULE 5: Geographic Information Systems and Photogrammetry	
Training Objectives	Approach to discipline
	Acquisition of awareness of the educational value of the discipline in the construction of one's professional profile
Targeted Skills	Proficiency in the expressive tools (oral and written) of the discipline to manage communicative interaction.
Specific Learning Objectives	Basic use of software using georeferenced data
	Knowledge of the different types of georeferenced data and their use
	Understanding of the concept of photogrammetry and knowledge of applications
	Knowledge of software for photogrammetry of drone images
Phased Sequence	Preparation and research of material by lecturers and learners.
	Presentation of the teaching unit to the class, using textbook, magazines
	Lectures
	Creation of working groups for the realization of a project
	Verification of skills and objectives through presentation and display of final product

	Remedial
Contents	UDA 1: Introduction to Geographical Information Systems
	UDA 2: Vector and Raster Layers
	UDA 3: Data processing and visualisation on Qgis
	UDA 4: Theoretical bases of photogrammetry and processing software
Methods	Lectures and dialogues through the functional-communicative approach
	Carrying out georeferenced data processing work
	Execution of a photogrammetry processing
MODULE 6: Monitoring techniques from drones	
Training Objectives	Approach to discipline
	Acquisition of awareness of the educational value of the discipline in the construction of one's professional profile
Targeted Skills	Proficiency in the expressive tools (oral and written) of the discipline to manage communicative interaction.
Specific Learning Objectives	Identify suitable instrumentation for acquiring information for the various survey activities
	Knowing which physical quantities contribute to the identification of the "target" of interest
	Analysis of processing techniques in use today and under development
Phased Sequence	Preparation and research of material by lecturers and learners.
	Presentation of the teaching unit to the class, using textbook, magazines
	Lectures
	Creation of working groups for the realization of a project
	Verification of skills and objectives through presentation and display of final product
	Remedial
Contents	UDA 1: Forest monitoring and planning and fire risk
	UDA 2: Hydrogeological monitoring
	UDA 3: Flora monitoring
Methods	Lectures and dialogues through the functional-communicative approach
	Production of a group paper related to the topics addressed
	Exposition of the elaboration.
MODULE 7: Distribution techniques from drones	
Training Objectives	Approach to discipline
	Acquisition of awareness of the educational value of the discipline in the construction of one's professional profile
Targeted Skills	Proficiency in the expressive tools (oral and written) of the discipline to manage communicative interaction.
Specific Learning Objectives	Overview of the main distribution techniques in the world
	Insights into the main techniques in use today in drone applications
	Overview of PAN regulations
Phased Sequence	Preparation and research of material by lecturers and learners.
	Presentation of the teaching unit to the class, using textbook, magazines
	Lectures

	Creation of working groups for the realization of a project
	Verification of skills and objectives through presentation and display of final product
	Remedial
Contents	UDA 1: Variable Rate Systems
	UDA 2: Aerial fertilisation
	UDA 3: Aerial seeding
	UDA 4: Aerial pest control
Methods	Lectures and dialogues through the functional-communicative approach

Course Duration

The duration of the INSIGHT course is estimated in 150 hours, comprises:

- Study hours → the time needed to read the training materials;
- Self-study hours → the time needed to understand the training materials and to read additional materials;
- Contact hours → questions launched in specific forums and interaction with other students;
- Practical exercises → required sessions of practice;
- Self-assessment → the time needed to prepare the assessment and execute it;
- Research and preparation of materials.

Additionally, another 52 hours were dedicated to dissemination.

4. Assessment

At the end of each instructional module, an evaluation test was administered. This test served a dual purpose: for the instructor, it was a tool to identify any gaps in teaching, ensuring that the course content was being effectively communicated and understood. For the students, it was an opportunity to assess their own level of preparation and understanding of the material covered.

These tests were designed to be comprehensive, covering all the key concepts and techniques discussed in the module.

The results of these evaluations were carefully analysed by the instructor. If common areas of difficulty were identified, additional resources and support were provided to address these issues. This feedback loop ensured that the course remained adaptive and responsive to the needs of the students, continuously improving in quality and effectiveness.

For the students, these assessments were valuable milestones in their learning journey. By reflecting on their performance, they could identify strengths and areas for improvement, guiding their study efforts more effectively. The tests also served to reinforce the material, helping students to retain information and build a solid foundation of knowledge.

The course also incorporated practical activities in the use of the UAS, flight plan preparation, data acquisition and subsequent processing. Practical lessons were essential to apply theoretical knowledge to real scenarios, reinforcing learning and promoting essential skills.

The “Use of Drones in Agriculture” training materials is uploaded and available on the classroom platform.
The lecturers provided various resources to deepen the students' understanding of the subject. These included textbooks for further reading, PowerPoint summaries, and PDF documents. Additionally, the results of tutorials and practical exercises are visible on the same platform.

Vertical farming[12]

1. Introduction

Period of implementation: December 2023 – June 2024

Vertical farming is an innovative agricultural practice that involves growing crops in vertically stacked layers, often integrated into other structures such as buildings, shipping containers, or repurposed warehouses. This method leverages controlled-environment agriculture (CEA) technology, where factors like temperature, light, water, and nutrients are meticulously regulated to optimize plant growth. Unlike traditional farming, vertical farming requires significantly less land and can be implemented in urban areas, reducing the distance food travels from farm to table.

One of the key benefits of vertical farming is its ability to produce food year-round, independent of seasonal changes and weather conditions. This leads to more consistent and reliable crop yields. Additionally, vertical farms use significantly less water than conventional farming methods, thanks to advanced irrigation techniques like hydroponics and aeroponics. The controlled environment also minimizes the need for pesticides and herbicides, resulting in cleaner and safer produce.

Vertical farming addresses several critical challenges faced by modern agriculture, including limited arable land, the environmental impact of traditional farming, and the growing demand for food due to urbanization and population growth. By bringing agriculture into the heart of cities, vertical farming not only contributes to food security but also promotes sustainable urban development. As technology continues to advance, vertical farming holds the promise of transforming how we grow and consume food, making it a pivotal component of the future of agriculture.

The course is offered to students of the fourth-year classes. However, students from other classes and teachers from the Agricultural Technical Institute "Emilio Sereni" were welcome to participate in the course. It was open to anyone interested in expanding their knowledge in the innovative field of vertical farming. 10 students and 2 teachers attended the course.

2. Execution of the training

The course focused on teaching the main techniques of vertical cultivation with the aim of designing a vertical garden located at the Agricultural Technical Institute "Emilio Sereni". It offered a comprehensive curriculum that included both in-person and online lectures to accommodate diverse learning preferences and schedules. During the course, participants explored various aspects of vertical farming, beginning with an

[12] Prepared by Elisa Cioccolo, Univeristy of Tuscia, Italy

introduction to the fundamental principles of this innovative agricultural practice. The curriculum covered topics such as controlled-environment agriculture (CEA), hydroponics, aeroponics, and aquaponics. Students learned how to manage and regulate crucial factors like light, temperature, humidity, and nutrient supply to optimize plant growth in vertical systems. One of the highlights of the course was the detailed study of the design and construction of vertical gardens. Participants gained hands-on experience by engaging in practical projects that involved planning and setting up a vertical garden at the institute. This project allowed them to apply theoretical knowledge to real-world scenarios, enhancing their understanding of the complexities and challenges involved in vertical farming.

In addition to the technical aspects, the course also addressed the economic and environmental impacts of vertical farming. Students learned about the potential benefits of vertical farming in urban settings, such as reduced transportation costs, lower water usage, and minimal need for pesticides and herbicides. The course emphasized sustainable practices and the importance of integrating vertical farming into urban planning to promote food security and environmental conservation.

Overall, the course aimed to equip participants with the expertise needed to successfully implement and manage vertical farming systems. By the end of the course, students and teachers were well-prepared to contribute to the design and maintenance of the vertical garden at the Emilio Sereni Agricultural Technical Institute. This initiative not only enhanced the educational experience at the institute but also demonstrated the practical applications of vertical farming in promoting sustainable agriculture.

The students then completed a feedback questionnaire on the teaching methods and content. They expressed a high level of satisfaction with the course, praising the comprehensive curriculum and the practical, hands-on approach to learning about vertical farming.

3. Curriculum

Learning outcomes related to the educational, cultural, and professional profile in the course can be identified as:

- Understanding the main technologies of vertical agriculture.
- Knowing how to manage a soilless cultivation system.
- Knowing how to design spaces used for urban greenery.
- Being able to present the knowledge acquired.

The program has been divided into four MODULES. For each module, the Learning Teaching Units have been allocated (hereinafter referred to as UDA).

MODULE I: Environmental benefits: energy and biomass	
Training Objectives	Approach to discipline
	Gaining awareness of the educational value of the discipline in building one's professional profile
Targeted Skills	Mastery of the expressive tools (oral and written) of the discipline suitable for handling communicative interaction in the group context
	Know the main applications of vertical farming
Specific Learning Objectives	Learning the importance of green energy
	Group work and flipped classroom organization
Phased Sequence	Preparation and research of material by teachers
	Presentation of the teaching unit to the class, using textbook, journals
	Frontal lectures
	Creation of working groups
	Laboratory and research lessons
	Accomplishment of the Task/Product
	Verification of skills and objectives through presentation and display of final product
	Retrieved
Contents	UDA 1: Course introduction and introduction to growing crops in a protected environment
	UDA 2: Environmental benefits, pollution reduction and food production
	UDA 3: Bioremediation
	UDA 4: Renewable energy and agrovoltaics
	UDA 5: Exercises
Methods	Frontal and dialogic lectures through the functional-communicative approach
	Establishment of working groups (formation of groups, assignment of tasks)
	Parallel class work with open classes
	Searching for scientific material
	Practical applications
	Oral exposition

MODULE II: Elements of ergonomics, safety and mechanization.	
Training Objectives	Understand the advantages and disadvantages of vertical farming
Targeted Skills	Mastery of the expressive tools (oral and written) of the discipline suitable for handling communicative interaction in the group context
Specific Learning Objectives	Knowing the health risks
	Learning the importance of urban greenery (ecological functions)
	Group work and flipped classroom organization
Phased Sequence	Preparation and research of material by teachers
	Presentation of the teaching unit to the class, using textbook, journals
	Frontal lectures
	Creation of working groups
	Laboratory and research lessons
	Accomplishment of the Task/Product
	Verification of skills and objectives through presentation and display of final product
	Retrieved
Contents	UDA 1: Ergonomics and occupational safety
	UDA 2: Elements of mechanization
	UDA 3: Vertical urban green
Methods	Frontal and dialogic lectures through the functional-communicative approach
	Establishment of working groups (formation of groups, assignment of tasks)
	Parallel class work with open classes
	Searching for scientific material
	Practical applications
	Oral exposition

MODULE III: Types of vertical agricultural crops.	
Training Objectives	Learn about cultivation methods other than traditional ones
	Understand the differences between practical applications of vertical cultivation
Targeted Skills	Mastery of the expressive tools (oral and written) of the discipline suitable for handling communicative interaction in the group context
Specific Learning Objectives	Know the main practical applications of vertical farming
	Learning the importance of the new frontiers of agriculture
	Group work
Phased Sequence	Preparation and research of material by teachers
	Presentation of the teaching unit to the class, using textbook, journals
	Frontal lectures
	Creation of working groups
	Laboratory and research lessons
	Accomplishment of the Task/Product
	Verification of skills and objectives through presentation and display of final product
	Retrieved
Contents	UDA 1: Off-site cultivation
	UDA 2: Hydroponic growing
	UDA 3: Aeroponic cultivation
	UDA 4: Cultivation substrates
Methods	Frontal and dialogic lectures through the functional-communicative approach
	Establishment of working groups (formation of groups, assignment of tasks)
	Parallel class work with open classes
	Searching for scientific material
	Practical applications
	Oral exposition

MODULE IV: Integrated management and economic analysis of vertical gardens.	
Training Objectives	Knowledge of plant propagation methods and micropropagation
	Understanding of the differences between traditional fertilization and precision fertigation
	Economic analysis for creating a vertical vegetable garden
Targeted Skills	Mastery of the expressive tools (oral and written) of the discipline suitable for handling communicative interaction in the group context
Specific Learning Objectives	Know the main management techniques in vertical farming
	Learn the importance of precision fertilization
	Analyze the cost-effectiveness of a vertical vegetable garden
	Group work and flipped classroom organization
Phased Sequence	Preparation and research of material by teachers
	Presentation of the teaching unit to the class, using textbook, journals
	Frontal lectures
	Creation of working groups
	Laboratory and research lessons
	Accomplishment of the Task/Product
	Verification of skills and objectives through presentation and display of final product
	Retrieved
Contents	UDA 1: Propagation techniques (general part)
	UDA 2: Plant micropropagation
	UDA 3: Irrigation and fertigation systems
	UDA 4: Designing vertical vegetable gardens
	UDA 5: LCA, operating cost and revenue analysis
Methods	Frontal and dialogic lectures through the functional-communicative approach
	Establishment of working groups (formation of groups, assignment of tasks)
	Parallel class work with open classes
	Searching for scientific material
	Practical applications
	Oral exposition

Course Duration

The duration of the INSIGHT course is estimated in 150 hours, comprises:

- Study hours → the time needed to read the training materials;
- Self-study hours → the time needed to understand the training materials and to read additional materials;
- Contact hours → questions launched in specific forums and interaction with other students;

- Practical exercises → required sessions of practice;
- Self-assessment → the time needed to prepare the assessment and execute it;
- Research and preparation of materials.

Additionally, another 52 hours were dedicated to dissemination.

4. Assessment

At the end of each instructional module, an evaluation test was administered. This test served a dual purpose: for the instructor, it was a tool to identify any gaps in teaching, ensuring that the course content was being effectively communicated and understood. For the students, it was an opportunity to assess their own level of preparation and understanding of the material covered. These tests were designed to be comprehensive, covering all the key concepts and techniques discussed in the module. This approach not only tested theoretical knowledge but also the practical skills necessary for success in vertical farming. The results of these evaluations were carefully analysed by the instructor. If common areas of difficulty were identified, additional resources and support were provided to address these issues. This feedback loop ensured that the course remained adaptive and responsive to the needs of the students, continuously improving in quality and effectiveness. For the students, these assessments were valuable milestones in their learning journey. By reflecting on their performance, they could identify strengths and areas for improvement, guiding their study efforts more effectively. The tests also served to reinforce the material, helping students to retain information and build a solid foundation of knowledge.
In addition to the module tests, a comprehensive written report was required at the end of the course. The report allowed students to explore specific topics in greater depth, demonstrating their ability to apply the knowledge gained throughout the course. The course also incorporated flipped classroom activities, a pedagogical approach where traditional learning environments are inverted. In this model, students were introduced to new content outside of class through readings or video lectures and then used classroom time for engaging in interactive, hands-on activities, problem-solving, and discussions. This method facilitated a deeper understanding of the material and encouraged active participation.
Furthermore, students participated in design and construction activities, providing practical experience in creating and managing vertical farming systems. These hands-on projects were crucial in applying theoretical knowledge to real-world scenarios, reinforcing learning and fostering essential skills in vertical farming.

The "Vertical Farming" training materials is uploaded and available on the classroom platform.
The Professor provided various resources to deepen the students' understanding of the subject. These included textbooks for further reading, PowerPoint summaries, and PDF documents. Additionally, the course materials were supplemented with videos and film clips to enhance the learning experience.

Techniques of organic farming[13]

1. Introduction

Period of implementation: December 2023 – June 2024

Organic farming is a type of agriculture that exploits the natural fertility of the soil, also enriched by natural products, also favouring limited interventions; it wants to promote the biodiversity of domestic species (both plants and animals), excludes the use of synthetic products and genetically modified organisms (GMOs).
Plant production with ever less impact on the environment have become increasingly important issues in today's society. The concept of organic agriculture includes a wide range of issues, from tillage to the use of products that stimulate plant growth and their natural defence against diseases and parasites. As awareness and sensitivity about the growing impact of human productive activities grows, there is a simultaneous increase in demand for better standards and practices to ensure an ever-lowering environmental impact.
This report, entitled "Organic Farming Techniques", aims to explore, through a comprehensive examination of current practices, ethical frameworks and legal regulations, the current state of organic farming and to propose actionable recommendations for improvement of current practices: all this is a critical issue that concerns not only agricultural production but also the environment, public health and social ethics. A less impactful mode of production can lead to better results in terms of public health, and at the same time favour a more humane and conscientious community.

The course is offered to students of the fourth-year classes. However, students from other classes and teachers from the Agricultural Technical Institute "Emilio Sereni" were welcome to participate in the course. It was open to anyone interested in exploring the state of the art and future possibilities regarding the use of Techniques of Organic Farming. 15 students attended the curse.

2. Execution of the training

The objective of the course was to provide a comprehensive understanding of the potential applications of Techniques of Organic Farming. This was achieved through a blended learning approach, integrating online and face-to-face lectures and practical exercises. The practical exercises constituted a pivotal element of the course, affording

[13] Prepared by Pietro D'Erario and Silvano Martucci, ITA Emilio Sereni, Italy

students the opportunity to engage in data acquisition missions at the Emilio Sereni Agricultural Technical Institute and subsequently process the data obtained.

Main findings and conclusions

The objective of the course was to equip participants with the requisite skills to implement precision farming technologies, with a particular focus on the utilisation of Techniques of Organic Farming within the framework of a farm's management system. Subsequently, the students were invited to complete a feedback questionnaire pertaining to the teaching methods and content. They expressed a high level of satisfaction with the course, commending the comprehensive curriculum and the practical, hands-on approach to learning about Techniques of Organic Farming.

3. Curriculum

Learning outcomes related to the educational, cultural, and professional profile in the course can be identified as:

● Knowing the main Techniques of Organic Farming indicators.

● Knowing the EU guidelines on Techniques of Organic Farming.

● Identify, starting from the description of a farm and/or traditional cultivation techniques, the main problems related to organic farming techniques

● Knowing the difference between traditional cultivation techniques and organic farming techniques

The program has been divided into SEVEN MODULES. For each module, the Learning Teaching Units have been allocated (hereinafter referred to as UDA).

MODULE 1: Introduction to Organic Farming	
Basics of teaching	Approach to discipline
	Acquisition of awareness in considering the Organic Farming fundamental from the point of view of the environmental ecosystem
	Acquiring the awareness that promoting good health in order to best express specific productive potential.
Specific Learning Objectives	To promote an organic farming culture in step with the times
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realisation of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: Basics and principles of organic agriculture
	UDA 2: Community, national and regional legislation
	UDA 3: PSR Lazio and organic agriculture

Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 2: Conversion of the farm to the organic method	
Basics of teaching	Farms that intend to produce organically must undergo the so-called "conversion" process. During this period, they must use organic production methods, but the resulting product cannot be sold as organic.
Specific Learning Objectives	How to use organic production methods in the conversion period
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realisation of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: The basis of the conversion: increase in the organic fertility of the soil and balance of the farm ecosystem
	UDA 2: Conversion phase: general information and critical aspects of the conversion period
	UDA 3: How to establish times and methods of business conversion: elaboration of the business conversion plan
	UDA 4: Documentation in the conversion phase
	UDA 5: Documentation in the conversion phase for livestock farms
	UDA 6: Technical means, necessary equipment and machinery fleet suitable for the organic farm
Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 3: Production in organic farming	
Basics of teaching	Organic agriculture means developing a production model that avoids the excessive exploitation of natural resources, in particular soil, water and air, instead using these resources within a development model that can last over time
Specific Learning Objectives	How to use organic production methods in organic farming
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation

	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realisation of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: Cultivation and agronomic techniques in organic farming
	UDA 2: Cultivation and agronomic techniques specific for the olive and wine sectors
	UDA 3: The organic method of livestock production
	UDA 4: Cultivation and agronomic techniques specific for the cereal sector
Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 4: Organic food processing	
Basics of teaching	The rules apply to all stages of production, preparation and distribution (from primary production through storage, processing, transport and distribution to supply to the final consumer). This means that all organic products in the EU follow strict rules from when they are produced until they arrive on the consumer's plate.
Specific Learning Objectives	How to use organic production methods in organic food processing
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realisation of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: The organic agri-food chain
	UDA 2 Processing, preservation, packaging and storage of organic foods
Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 5: Quality assurance system on the organic farm	
Basics of teaching	The system of standards behind organic production requires operators to develop a real management system. The community regulation on

	organic farming clearly defines it as "a global system of farm management and food production". For this reason, operators who decide to adopt this production system must first demonstrate that they have a management system suitable to satisfy the process and product compliance requirements.
Specific Learning Objectives	Understand quality assurance system on the organic farm
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realisation of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: Quality system regulations
	UDA 2: Documentation of a quality system
	UDA 3: Labeling of organic products
	UDA 4: Tracking and traceability in an organic product supply chain
	UDA 5: Hygiene and safety along the organic supply chain
Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 6: Certification and control system in organic farming	
Basics of teaching	Organic certification is obtained when the production system complies with the requirements of the EU Regulations
Specific Learning Objectives	Define and know the control system suitable to guarantee the conformity of organic production
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realisation of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: The certification and control system in organic agriculture
	UDA 2: Certification documents: annual production program, cultivation sheet, raw materials sheet, sales sheet
	UDA 3: Inspection checks at the start-up phase
	UDA 4: Inspection checks during the surveillance phase
	UDA 5: Cases of non-compliance

Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

MODULE 7: Marketing and sales of organic products	
Basics of teaching	People want to eat well and ethically, they pay attention not only to the quality of the finished product, but also to the production chain. Here the consumption of organic agri-food products is spreading like wildfire: a wave of success to be seized upon by those who work in this thriving sector.
Specific Learning Objectives	Discover and learn about the importance of marketing strategies and concepts for organic products
	Group work and flipped classroom organisation
Phased Sequence	Preparation and research of material by the teacher
	Presentation of the teaching unit to the class, using multimedia presentation
	Frontal lessons
	Creation of working groups
	Laboratory and research lessons
	Realisation of the task/product
	Verification of skills and objectives through presentation and exhibition of the final product
Contents	UDA 1: The organic products market
	UDA 2: Research of communication and commercial strategies for the sale of products
	UDA 3: Direct selling: potential and how to improve it
	UDA 4: E-commerce, advertising on social networks, apps and new frontiers for online sales
Methods	Frontal and dialogued lessons using the functional-communicative approach
	Creation of working groups (formation of groups, assignment of tasks)
	Research of scientific material
	Practical applications
	Oral exposition

Course Duration

The duration of the INSIGHT course is estimated in 150 hours, comprises:

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Additionally, other 52 hours were dedicated to dissemination.

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At the end of each instructional module, an evaluation test was administered. This test served a dual purpose: for the instructor, it was a tool to identify any gaps in teaching, ensuring that the course content was being effectively communicated and understood. For the students, it was an opportunity to assess their own level of preparation and understanding of the material covered. These tests were designed to be comprehensive, covering all the key concepts and techniques discussed in the module.
The results of these evaluations were carefully analysed by the instructor. If common areas of difficulty were identified, additional resources and support were provided to address these issues. This feedback loop ensured that the course remained adaptive and responsive to the needs of the students, continuously improving in quality and effectiveness.
For the students, these assessments were valuable milestones in their learning journey. By reflecting on their performance, they could identify strengths and areas for improvement, guiding their study efforts more effectively. The tests also served to reinforce the material, helping students to retain information and build a solid foundation of knowledge.
The course also incorporated practical activities in the use of the Animal Welfare for a better Future. Practical lessons were essential to apply theoretical knowledge to real scenarios, reinforcing learning and promoting essential skills.

The "Techniques of Organic Farming" training materials is uploaded and available on the classroom platform.
The lecturers provided various resources to deepen the students' understanding of the subject. These included textbooks for further reading, PowerPoint summaries, and PDF documents. Additionally, the results of tutorials and practical exercises are visible on the same platform.

Further Training Electrician preparation for Technician[14]

1. Legal basis

- Qualifying vocational courses are covered by the regulations of the Ministry of National Education of May 16, 2019.
- Regulation of the Ministry of National Education of February 15, 2019, on the general objectives and tasks of education in vocational education professions and the classification of vocational education professions,
- Regulation of the Minister of Education and Science of October 6, 2023, on continuing education in non-school forms (Journal of Laws item 2175),
- Regulation of the Ministry of National Education of May 16, 2019, on the core curriculum for vocational education professions and additional professional skills in selected vocational education professions,
- Regulation of the Minister of Family, Labor and Social Policy of August 7, 2014, on the classification of professions and specialties for the needs of the labor market and the scope of its application based on the International Standard ISCO.

Entry requirements for participants:

- having primary education and being over 18 years of age
- Objectives of training:

Available for use with professional devices:

- execution and commissioning of electrical installations based on documentation to have;
- mounting and starting machines and electrical devices on the base storage documentation;
- maintenance of installations, machines and utility devices;
- operation of electrical installations;
- operation of generally accessible machines and devices.

2. Educational effects

Complete higher professional tasks that are necessary

Possible learning outcomes include:

- effects of education common to all professions (OHS). Occupational health and safety Student
- he concept of concepts related to the necessity and hygiene of work, protection fire protection, environmental protection and ergonomics;

[14] Izba Rzemieslnicza Malej i Sredniej Przedsiebiorczosci, Poland

- resolution of tasks and executive bodies and services within the scope labor protection and environmental protection in Poland;
- defining the rights and obligations of the employee and the employer in the scope occupational safety and security;
- threat to human health and life, property and the environment limited to professional tasks;
- determining the threat of causing consequences in the work environment;
- effects on the human body;
- workstation as required ergonomics, occupational health and safety, protection fire protection and environmental protection;
- use of individual and collective protective equipment when performing tasks professional.

3. Starting and running a business

Student:

- applies concepts from the area of functioning of the market economy;
- applies labor law provisions and data protection provision0s0personal data and provisions of tax law and copyright law;
- applies legal provisions regarding running a business; distinguishes enterprises and institutions operating in the industry and connections, between them;
- analyzes activities carried out by enterprises operating in the industry;
- initiates joint ventures with various enterprises from the industry;
- prepares documentation necessary for launch and operation business activities;
- conducts correspondence related to running a business;
- operates office equipment and uses computer programs supporting business activities;
- plans and undertakes marketing activities for the business economic;
- plans activities related to the introduction of innovative solutions;
- applies the principles of standardization;
- optimizes the costs and revenues of business activities.

Personal and social competences

Student:

- complies with the principles of culture and ethics;
- is creative and consistent in carrying out tasks;
- can plan activities and manage time;
- predicts the effects of actions taken;
- is responsible for the actions taken;
- is open to changes;
- uses stress coping techniques;
- updates knowledge and improves professional skills;

- respects professional secrecy;
- negotiates the terms of agreements;
- is communicative;
- applies methods and techniques to solve problems;
- works in a team.

Organization of work of small teams (only for taught professions at technician level)

Student:

- plans and organizes the team's work in order to perform assigned tasks;
- selects people to perform assigned tasks;
- manages the execution of assigned tasks;
- monitors and evaluates the quality of performance of assigned tasks;
- introduces technical and organizational solutions contributing to improvement working conditions and quality;
- uses methods of work motivation;
- communicates with colleagues

Skills that constitute the basis for education in professions:

telecommunications network and equipment installer, electronics engineer, electrome-chanic,

electrician, telecommunications technician, ICT technician, electronics technician,

electrical technician, electronics and medical IT technician, technician

broadband electronic communications

Student:

1) uses concepts from the field of electrical engineering and electronics;

2) AC and AC product description;

3) interprets physical quantities with direct and alternating current;

4) application of electrical engineering law to calculate and estimate values electrical in electrical circuits and electronic systems;

5) recognizes electrical and electronic components and systems;

6) electrical and electronic connection diagram;

7) parameters of element parameters and electrical and electronic;

8) uses technical drawings during assembly works, i.e installation;

9) selecting tools and measurement tools and completing work in the scope mechanical components and electrical devices and Student.

- uses concepts from the field of electrical engineering and electronics;
- describes phenomena related to direct and alternating current;
- interprets physical quantities related to direct and alternating current;
- applies the laws of electrical engineering to calculate and estimate the value of quantities electrical in electrical circuits and electronic systems;
- recognizes electrical and electronic components and systems;
- prepares diagrams of electrical and electronic systems;
- distinguishes the parameters of electrical components and systems electronic;
- uses technical drawings during assembly works I installation;
- selects tools and measuring instruments and performs work in the field mechanical assembly of electrical components and devices electronic;
- performs manual processing work;
- defines the functions of electrical and electronic components and systems based on technical documentation;
- connects electrical elements and systems and electronic based on conceptual and assembly diagrams;
- selects methods and instruments for measuring the parameters of electrical systems and electronic;
- measures the size of electrical elements and systems electronic;
- presents the results of measurements and calculations in the form of tables;
- uses technical documentation, catalogs and operating manuals and complies with standards in this area;
- uses computer programs to support the performance of tasks.

Installation, commissioning and maintenance of electrical installations

Student:

- recognizes network systems and anti-shock protection measures;
- distinguishes power wires and cables;
- recognizes installation equipment and accessories;
- recognizes light sources and lighting fixtures;
- specifies the technical parameters of electrical installations and installation equipment;
- performs electrical installations in residential and industrial buildings in accordance with the documentation;
- prepares conceptual and assembly diagrams of electrical installations;
- routes the cables and the arrangement of installation equipment based on documentation;
- selects tools for assembly and disassembly of the installation electrical in various technologies;

- makes connections between electrical components based on documentation;
- checks the correct operation of the electrical installation and protection measures anti-shock after installation;
- inspects electrical installations;
- locates faults occurring in electrical installations;
- selects spare parts for electrical installation elements on the basis of catalog data;
- replaces damaged elements of electrical installations;
- performs measurements of electrical installation parameters;
- performs maintenance work on electrical installations in accordance with documentation.