



WP2 – A4

INSET Capacity Building Methodology Definition

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1. Introduction

This report presents an **overview of the INSET training program**, designed to equip target groups with essential knowledge, skills, and competences related to Industrial Symbiosis (IS) principles.

The objectives of this report are threefold:

- to define specific **learning outcomes** derived from the competency map, covering knowledge, skills, and competences necessary for proficiency in IS practices.
- to outline the **structure of the Joint Curriculum**, detailing modules, duration, credits, and training pathways.
- to emphasise the **harmonization** of the Joint Curriculum **with the European Qualifications Framework (EQF)** to ensure compatibility with various national qualifications systems.

The report is structured into several sections:

- (1) **Introduction** - Provides an overview of the report's scope and objectives, setting the stage for the subsequent sections.
- (2) **Learning Outcomes from the Competency Map** - Defines specific learning outcomes derived from the competency map (WP2-A2) for IS Planners and IS Project Managers. This involves identifying the essential knowledge, skills, and competencies needed for these roles, ensuring that all identified needs and barriers were addressed. We focused on defining what participants should know, be able to do, and understand by the end of the training. These learning outcomes form the basis for our Joint Curriculum, aligning the specific content of the training course with the requirements of the profiles.
- (3) **Structure and methodology of the Joint Curriculum** - Details the structure of the Joint Curriculum, including modules, duration, credits, training pathways, and EQF level.
- (4) **Definition of Learning Outcomes and Content Description** - Articulates the defined learning outcomes in conjunction with content descriptions for each module, outlining the knowledge, skills, and competences learners can expect to acquire.
- (5) **Conclusions** - Offers concluding remarks summarizing the key insights and implications discussed in the report.
- (6) **Annex 1: Learning Outcomes for the IS Manager and IS Project Manager** - Provides the complete table of learning outcomes for both profiles.
- (7) **Annex 2: EQF and NQF** - Provides supplementary information on the European Qualifications Framework (EQF) and National Qualifications Frameworks (NQF) to contextualize the harmonization efforts of the IS training program with European standards.

2. Learning outcomes from the competency map

The **learning outcomes** of the INSET Joint Curriculum are derived from a competency mapping process, designed to address identified needs, barriers, and critical skills essential for the IS Planner and IS Project Manager profiles. These outcomes encompass the knowledge, skills, and competencies that participants are expected to acquire and demonstrate upon completing the training.

Learning outcomes articulate what learners should know, do, and understand by the end of their educational journey, aligning with the Recommendations on the European Qualifications Framework – EQF¹. They delineate the essential knowledge that learners should comprehend, the skills they should master, and the competencies they should be able to execute in specific professional contexts.

Competencies represent the learner's ability to apply a combination of skills and theoretical knowledge in professional settings. **Skills** denote the learner's mastery in the application of practical abilities or know-how. **Knowledge** refers to the sum of ideas and perceptions acquired through formal or professional training, which can be applied in working situations².

The INSET Joint Curriculum is structured to ensure that learners not only acquire comprehensive knowledge but also develop practical skills and competencies crucial for excelling in their respective roles as IS planners and IS project managers. These learning outcomes underscore the program's commitment to preparing professionals who can navigate complex IS environments effectively and contribute to sustainable and innovative practices within their organizations.

¹ Recommendations of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning. [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008H0506\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008H0506(01))

² Cedefop (2022). *Defining, writing and applying learning outcomes: a European handbook - second edition*. Luxembourg: Publications Office. <http://data.europa.eu/doi/10.2801/703079>

2.1. IS Planner profile

IS Planner profile description

The IS Planner is a strategic role dedicated to designing and planning IS initiatives. This role emphasizes establishing the groundwork for successful IS implementation, guiding stakeholders toward collaborative and resource-efficient practices, and maximizing mutual benefits within the industrial ecosystem. IS Planners are generally suited for stakeholders in administrative and business support environments, who are not directly involved in production processes but support producers or create the framework within which producers operate.

IS Planner profile Competency Map

Knowledge	Skills	Competencies
<ul style="list-style-type: none"> • Knowledge on data collections and material flows needed for IS • Understanding IS and connecting stakeholders • Awareness raising of stakeholders (industry and administration) 	<ul style="list-style-type: none"> • Ability to collect and analyse data for material and energy • Ability to present the advantages of IS for the stakeholders needed to cooperate 	<ul style="list-style-type: none"> • Applying knowledge to design and supervise the IS among different actors, fostering IS within the existing framework

Target

This profile answers the needs of administration and business support environments by identifying potential IS opportunities, suggesting implementation strategies, and fostering collaboration.

Based on the competency map of IS Planner and the expected knowledge suggested in the report INSET Competency Map (May 2024), Consortium have developed the learning outcomes of this profile that will help them to elaborate the specific contents of the training course for this profile. This will ensure that the training is comprehensive, targeted, and aligned with the essential skills, knowledge, and competencies required for effective IS planning.

The complete table of learning outcomes can be checked in [Annex 1: Learning Outcomes for the IS Manager and IS Project Manager](#). The following tables only provide the learning outcomes specific to each profile.

IS Planner profile Learning Outcomes

Knowledge	Skills	Competencies
<p><i>The learner understands...</i></p> <ul style="list-style-type: none"> • Methodologies and strategies for identifying, prioritizing, and mapping resource opportunities in IS, including techniques for visualizing resource data. • Criteria for assessing territory readiness and sector compatibility in IS planning. • Governance structures and mechanisms for managing IS projects at different levels. 	<p><i>The learner is empowered to...</i></p> <ul style="list-style-type: none"> • Implement sustainable resource management practices • Implement governance frameworks to effectively manage and coordinate IS projects. 	<p><i>The learner conducts the following tasks...</i></p> <ul style="list-style-type: none"> • Manage and optimize resources and processes within IS frameworks, assessing benefits and barriers to IS adoption, and developing strategies to overcome challenges. • Utilize systemic vision and data collection methods to gather relevant information on resource inputs and outputs, identifying and leveraging opportunities among industries within specific territories. • Prioritize IS opportunities based on feasibility, impact, and strategic importance, collaborating with stakeholders to define clear roles and responsibilities in governing IS initiatives.

2.2. IS Project Manager profile

IS Project Manager profile description

The IS Project Manager is responsible for overseeing the implementation of IS initiatives, primarily within production environments or among groups of producers such as clusters or associations. This role involves managing day-to-day operations, ensuring regulatory compliance, and facilitating communication between various stakeholders. IS Project Managers are essential for businesses aiming to implement IS by utilizing existing resources and infrastructure effectively while managing associated risks and challenges.

IS Project Manager profile Competency Map

Knowledge	Skills	Competencies
<ul style="list-style-type: none"> • Implementation of IS • Financial structure of the process of IS. • Knowledge of legal and administrative regulations relevant for IS. 	<ul style="list-style-type: none"> • Ability to identify support environment and gain financial sources for implementation of IS. • Ability to implement IS in accordance with national/regional/local regulatory frameworks. 	<ul style="list-style-type: none"> • Applying to relevant mechanisms designed to support IS. • Managing the process of setting up IS within a company or between various companies.

Target

This profile will answer the need of businesses willing to implement IS by managing the implementation of IS within the given framework.

IS Project Manager profile Learning Outcomes

Knowledge	Skills	Competencies
<p><i>The learner understands...</i></p> <ul style="list-style-type: none"> • The significance of IS "Intrapreneurship" • Business models in IS project planning. 	<p><i>The learner is empowered to...</i></p> <ul style="list-style-type: none"> • Identify the characteristics of an IS Intrapreneur 	<p><i>The learner conducts the following tasks...</i></p> <ul style="list-style-type: none"> • Apply business models effectively for IS projects and apply monitoring

-
- Strategies for monitoring and impacts calculations in IS initiatives.
 - Methodologies of reporting and certification in IS projects.
 - Apply business models to IS projects
 - Utilize key performance indicators (KPIs) for measuring IS project impacts.
 - Understand the importance of reporting and certification in IS projects.
 - and impacts calculations within IS initiatives.
 - Develop reporting and certification strategies for IS projects.
-

By aligning the curriculum with these learning outcomes, we ensure that participants gain the necessary knowledge, skills, and competencies to excel in their respective roles, thereby advancing the practice of IS and contributing to sustainable industrial development.

3. Structure and methodology of the Joint Curriculum

The INSET training course is designed as a comprehensive **25-hour on-line training program**, complemented by an additional **75 hours of self-directed learning**, culminating in a **total learning time of 100 hours**. The course aims to equip participants with the essential skills and knowledge required for the roles of IS Planner and/or IS Project Manager. **Five learning modules** have been developed. Participants have the flexibility to schedule their learning, enabling a broader audience to benefit from the training and ensuring effective acquisition of knowledge and skills.

3.1. Modules of INSET course

The course is structured into modules and units, allowing learners to choose topics that best match their interests and needs. This modular structure supports both the comprehensive completion of the entire course and the selective learning of specific parts, making it adaptable to individual needs and expectations. A preliminary **introductory module** is available to help learners orient themselves according to their training needs.

Based on the identified learning outcomes, the following **five training As** have been defined to structure the course. Each module's content was selected for its relevance and importance, as determined by the competency map. The time allocated to each topic and module reflects the depth of coverage required. The introductory module serves as a guide for the course and does not have specific learning outcomes.

IS planner profile

IS project manager profile

Module 0. Introduction to the course (4 hours) – This introductory module explains the course structure, duration, learning paths, and self-assessment activities, helping learners orient themselves and identify their training needs.

Module 1. General context of Industrial Symbiosis (24 hours) – This module introduces the fundamental concepts and principles of industrial symbiosis and its role in promoting sustainable industrial practices.

Module 2A. Designing Industrial Symbiosis projects (24 hours) - This module focuses on strategic planning and design of IS projects, covering identification of opportunities, ecosystem analysis, and stakeholder engagement.

Module 2B. Managing Industrial Symbiosis projects (24 hours) - This module focuses on practical aspects of implementing and managing IS projects, including coordination, monitoring, and optimization.

Module 3. Legal and financial issues in Industrial Symbiosis (12 hours) – This module covers legal and financial aspects of IS, including regulatory frameworks and funding mechanisms.

Module 4. Communication and soft skills in Industrial Symbiosis (12 hours) – This module develops essential communication tips and tools and soft skills relevant to IS.

3.2. Methodology of INSET course

The INSET course will be delivered **online**, leveraging the benefits of e-learning, such as accessibility for many students, flexible access to training materials, and adaptable scheduling. Learners can select modules based on their interests and follow the course in any sequence. However, we recommend a **linear progression** through the modules for a comprehensive learning experience.

A system will be in place to show the **percentage of module completion** (%). Once learners reach 100% completion of a module, they will be ready to take the **self-assessment quiz**. Alternatively, learners can opt to take the quiz directly without completing the module if they feel confident in their understanding of the content. Achieving a **score of 8 or higher** on these quizzes is required to earn a **certificate**. This approach allows learners flexibility in their learning journey while ensuring that assessment standards are met.

Participants can choose between **two training pathways** based on their roles: the IS Planner pathway or the IS Project Manager pathway. Each pathway offers a selection of modules to ensure a thorough learning experience for each profile. To receive the course certificate, participants must complete the final module assessments corresponding to their chosen pathway.

The modular structure of the course allows participants to plan their learning and systematically build their knowledge and skills. The estimated learning time for each topic includes reading materials, watching videos, self-learning, and self-assessment. The allocation of learning time reflects the complexity of the topics and the length of the training materials. Quizzes are included for each module to allow users to test their knowledge acquisition. These quizzes are compulsory for obtaining the certificate at the end of the training.

Students who pass the assessment tests of their chosen pathway will receive a certificate. This certificate will include the following details: the title of the course, the student's name and surname, the date, the number of hours and correspondent modules. The certificate will be distributed via the learning platform.

There are three types of certificates available upon course completion:

- IS Planner Pathway Completion – Awarded for completing the IS Planner pathway (3 credits, 76 hours).
- IS Project Manager Pathway Completion – Awarded for completing the IS Project Manager pathway (3 credits, 76 hours).
- Full Course Completion – Awarded for completing all modules (4 credits, 100 hours).

The INSET course will offer a range of **training materials and assessment methods** to support a comprehensive evaluation of learning outcomes. Participants will have access to slides, videos, infographics, exercises, and quizzes, ensuring a multi-dimensional approach to learning.

Each module will include:

- **Slides** (PPT): these will contain links to additional relevant open-source resources. For a 1-hour course, we estimate using between 10 to 20 slides. Based on previous experiences, a one-hour course required approximately 12 slides. The exact number will depend on the complexity of the content, as well as the use of graphics or visuals. The length of the course materials may also vary depending on supplementary resources provided to learners, such as articles or case studies. We will adapt the slides and other materials as the content is finalized.
- **Motion videos** (PowToon): animated videos will be used to enhance engagement and understanding of key topics.
- **Quizz**: these will include a mix of fill-in-the-blank, true/false, matching, and multiple-choice questions to assess knowledge retention and comprehension.

Although PowerPoint will be used to develop core content, we may also incorporate additional tools and formats, such as videos or PDF documents, for case studies and templates. Given that the content is still under development, it's challenging to make definitive decisions regarding all the tools and formats at this stage.

Some units may also incorporate future INSET deliverables, such as the Handbook for IS Networking Sessions for the "Soft Skills Needed in IS" unit, or the "State-of-the-Art of EU IS Policies" deliverable in Unit 3.1.

To streamline the course development process, we will organize the work through a **dashboard**. This will allow us to monitor the progress of each partner and simplify the development of individual modules.

The course will be conducted **in English**, equipping learners with the necessary vocabulary for international communication through a glossary.

3.3. Duration, credits and pathways

The **European Credit System for Vocational Education and Training (ECVET)** was established to enhance the recognition, accumulation, and transfer of learning outcomes. This initiative aims to support mobility, lifelong learning, and the development of a European credit system in vocational education and training. Over the past decade, ECVET has significantly contributed to improving the quality of mobility experiences by focusing on the use and documentation of units of learning outcomes.

Each ECVET credit equates to 25 hours of total learning, encompassing:

- Reading and studying: this refers to the time necessary to review and study the provided training materials thoroughly. Learners are expected to engage with written content, course materials, and any supplementary resources provided.
- Self-learning: this entails the time required for learners to understand the training materials comprehensively and delve deeper into the subject matter through additional self-directed study. It encourages independent exploration and consolidation of knowledge.
- Video watching: participants will spend time watching training videos provided as part of the course content. These videos may include lectures, demonstrations, case studies, or practical examples relevant to the training objectives.

- Self-assessment: learners will dedicate time to prepare for and complete self-assessment activities. These assessments may include quizzes, true/false questions or other type of exercises designed to evaluate understanding and reinforce learning.

Figure 1. Summary of total learning meaning in VET



Despite its achievements, the ECVET points concept has not been widely adopted, and the envisioned European credit system in vocational education and training has not materialized. As a result, the Council Recommendation of 24 November 2020³ suggests maintaining the key principles of ECVET, such as the flexibility offered by units of learning outcomes but calls for further development of ECVET tools within other EU frameworks, such as the Erasmus+ programme.

For vocational qualifications at the post-secondary and tertiary levels, the **European Credit Transfer and Accumulation System (ECTS)** remains applicable. In place of a credit point system, it is recommended to implement a framework that clearly delineates the knowledge, skills, and competences that learners have validated. This approach ensures that the value of the learning outcomes is effectively communicated and recognized, thereby supporting the goals of mobility and lifelong learning within the IS training course.

Based on the ECTS, the course duration is set at **100 hours**, equivalent to **4 credits**. This duration is distributed across the modules as follows:

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020H1202%2801%29>

Table 1. Time distribution in the INSET course

Module	Name	Total training duration (hours)	Relative weight (%)	Number of credits	Training pathway
Module 0	Introduction to the course	4	4%	0.16	IS Planner IS Project Manager
Module 1	General context of IS	24	24%	0.96	IS Planner IS Project Manager
Module 2A	Designing IS projects	24	24%	0.96	IS Planner
Module 2B	Managing IS	24	24%	0.96	IS Project Manager
Module 3	Legal and financial issues	12	12%	0.48	IS Planner IS Project Manager
Module 4	Communication and soft skills	12	12%	0.48	IS Planner IS Project Manager
Total		100	100%	4	

As we already explained, users can choose between two **training pathways** based on their role: the IS Planner pathway or the IS Project Manager pathway. The IS Planner pathway includes Modules 0, 1, 2A, 3, and 4, totalling 76 hours and equivalent to 3 credits. The IS Project Manager pathway covers Modules 0, 1, 2B, 3, and 4, also totalling 76 hours and 3 credits.

Table 2. Training pathways duration and credits.

Training pathway	Modules included	Total hours	Total credits
IS Planner	0, 1, 2A, 3 and 4	76	3
IS Project Manager	0, 1, 2B, 3 and 4	76	3

3.4. INSET EQF Level

In this section, we focus on harmonizing the learning outcomes for our INSET course, ensuring alignment with both **European and National Qualification Frameworks**. By doing so, we aim to enhance the transparency, comparability, and transferability of qualifications, thereby promoting mobility and recognition across borders.

The European Qualifications Framework (EQF) is a translation tool that facilitates communication and comparison between different qualification systems across Europe. It consists of eight common European reference levels, each described in terms of knowledge, skills, and competences. These levels define what individuals know, understand, and can do at the end of a learning process. The core of the EQF is its eight reference levels, defined in terms of learning outcomes.

Based on the EQF descriptors, INSET aligns closely with the attributes specified for **EQF level 5**, emphasizing substantial and specialized knowledge applicable to professional fields. This level signifies a robust understanding of theoretical foundations and practical applications essential for planning and managing complex projects. Given that the target audience for INSET includes future IS planners and IS project managers, EQF level 5 is unanimously agreed upon by all partners. This level ensures that learners acquire the depth of knowledge and breadth of skills necessary to navigate dynamic work environments effectively.

Level	Knowledge	Skills	Competences
5	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study, and an awareness of the boundaries of that knowledge	A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems.	Exercise management and supervision in contexts of work or study activities where there is unpredictable change. Review and develop performance of self and others.

For more detailed information on the EQF and the National Qualification Frameworks (NQFs) of INSET partner countries (Spain, France, Italy, Slovenia, Lithuania), please refer to [Annex 2: EQF and NQF](#).

4. Modules, learning units and topics

Each module within the INSET Joint Curriculum is structured into distinct **Learning Units (LUs)** to facilitate the learning process and ensure a seamless transition throughout the training course. Below is an overview of each module⁴, including its component units, the learning pathways (IS Planner and IS Project Manager) and the allocated time for each module.

Table 3. Learning Units of each training module

Module 1	Module 2A	Module 2B	Module 3	Module 4
General context of IS	Designing Industrial Symbiosis projects	Managing IS	Legal and financial issues	Communication and soft skills
LU 1.0. Introduction LU 1.1. What is IS LU 1.2. Case studies in IS LU 1.3. Benefits and barriers of IS LU 1.4. Resources and processes in IS LU 1.5. Stakeholders in IS	LU 2A.0. Introduction LU 2A.1. Understanding IS planning & the role of the facilitator LU 2A.2. Opportunities identification and prioritization LU 2A.3. Data analysis for resource mapping LU 2A.4. CE and governance	LU 2B.0. Introduction LU 2B.1. The IS Intrapreneur LU 2B.2. IS business models LU 2B.3. Monitoring and impact calculation LU 2B.4. Reporting and certifications	LU 3.0. Introduction LU 3.1. Regulation & legal framework LU 3.2. Financing resources for CE and IS projects	LU 4.0. Introduction LU 4.1. Communication in IS LU 4.2. Soft skills needed in IS
IS Planner IS Project Manager	IS Planner	IS Project Manager	IS Planner IS Project Manager	IS Planner IS Project Manager
24 hours	24 hours	24 hours	12 hours	12 hours

4.1. Learning outcomes and content description

This section outlines the **learning outcomes** and **content description** for each learning unit (LU) within the five modules of the INSET training course. The learning outcomes are structured to develop competencies, skills, and knowledge essential for comprehending and effectively applying IS principles in practical scenarios. Each LU's content description

⁴ Please note that Module 0 is not considered a learning module. It serves as a guide for the training course, providing essential information and instructions for participants.

provides a breakdown of topics covered, accompanied by key words to highlight the main themes addressed.

MODULE 1

GENERAL CONTEXT OF INDUSTRIAL SYMBIOSIS

<p style="text-align: center;">LU 1.1. What is Industrial Symbiosis?</p> <ul style="list-style-type: none"> • Introduction IS and CE concepts • Topic 1 Definition and scope of IS • Topic 2 Examples of IS projects and synergies between companies • Topic 3 Types of industrial symbiosis networks • Topic 4 Market potential for IS 	<p style="text-align: center;">LU 1.2. Case studies⁵</p> <ul style="list-style-type: none"> • Introduction Overview of diverse IS projects and initiatives across different industries and regions (mapping) • Topic 1 Case studies: territorial approach • Topic 2 Case studies: industrial park approach • Topic 3 Case studies: company approach • Topic 4 Analysis of key factors contributing to the success of IS projects • Topic 5 Lessons learned, including challenges and best practices⁶ 	
<p style="text-align: center;">LU 1.3. Benefits and barriers</p> <ul style="list-style-type: none"> • Introduction Benefits and barriers in IS • Topic 1 Economic benefits • Topic 2 Environmental benefits • Topic 3 Social benefits • Topic 4 Common barriers to IS adoption 	<p style="text-align: center;">LU 1.4. Resources and processes</p> <ul style="list-style-type: none"> • Introduction IS resources and processes • Topic 1 Types of resources involved in IS • Topic 2 Water management • Topic 3 Waste and materials management • Topic 4 	<p style="text-align: center;">LU 1.5. Stakeholders</p> <ul style="list-style-type: none"> • Introduction Stakeholders in IS • Topic 1 Identification of key stakeholders in IS networks • Topic 2 Stakeholders' roles and responsibilities • Topic 3 Stakeholders' engagement strategies

⁵ Stakeholder's suggestion: add an SME from the service sector (optional)

⁶ Related to WP3-A4 Publication of Best Practices (CETEM)

- Topic 5
Strategies for overcoming barriers

Energy management

LEARNING OUTCOMES

Knowledge	Skills	Competencies
<p><i>The learner understands...</i></p> <ul style="list-style-type: none"> • Fundamental principles of IS • Various types of IS networks and their characteristics • Market potential opportunities • Diverse applications of IS across different industries and regions/countries • Key factors influencing the success of IS projects • Challenges commonly faced during IS project implementation • Economic, environmental, and social benefits of IS • Types of resources involved in IS and sustainable resource management practices • Key stakeholders in IS networks and their roles • Effective stakeholder engagement strategies specific to IS networks 	<p><i>The learner is empowered to...</i></p> <ul style="list-style-type: none"> • Define and scope IS, identifying its potential and applications • Evaluate different types of IS networks • Evaluate case studies of IS projects • Analyse lessons learned from IS case studies • Evaluate the economic, environmental, and social benefits of IS • Implement sustainable resource management practices • Identify and communicate effectively with various stakeholders 	<p><i>The learner conducts the following tasks:</i></p> <ul style="list-style-type: none"> • Define and conceptualize IS and CE • Analyse IS projects and identify synergies between companies • Assess market potential associated with IS • Analyse and evaluate different approaches to IS projects • Identify key success factors and challenges of IS projects • Assess benefits and barriers to IS adoption • Categorize different types of resources essential to IS • Manage and optimize resources and processes within IS frameworks • Identify and engage key stakeholders in IS networks • Develop strategies to engage stakeholders effectively

Key words

Industrial Symbiosis, Circular Economy, resource efficiency, symbiotic relationships, innovation, ecosystem, waste valorisation, synergies, business opportunities, economic incentives, regulatory frameworks, sustainable products, geographical proximity, resource sharing, waste reduction, case studies, industrial park, collaboration, leadership, technological innovation, barriers, improvements, environmental benefits, sustainable practices, job creation, strategies, stakeholders, engagement strategies.

CONTENT DESCRIPTION

LEARNING UNIT 1.1.

WHAT IS INDUSTRIAL SYMBIOSIS?

Title	Summary
Introduction IS and CE concepts	In this introductory section, participants will be introduced to the foundational concepts of IS and its relationship with the CE. The

		discussion will outline how IS promotes resource efficiency and sustainability within industrial ecosystems, aligning with CE principles.
Topic 1	Definition and scope of IS	In this topic, participants will delve into the definition and scope of IS. They will explore the core principles of IS, including the sharing of resources, waste valorisation, and collaborative relationships among industries. Emphasis will be placed on understanding the fundamental components that characterize IS initiatives.
Topic 2	Examples of IS projects and synergies between companies	Participants will examine real-world examples of successful IS projects and the synergies achieved between companies. By analysing these examples, participants will gain insights into how IS fosters symbiotic relationships, reduces environmental impact, and enhances economic outcomes through resource exchange and innovation.
Topic 3	Types of industrial symbiosis networks	This topic introduces participants to various types of networks within Industrial Symbiosis (IS). Participants will explore different network models, such as physical co-location, virtual networks facilitated by digital platforms, and regional symbiosis networks. They will understand how these networks facilitate resource sharing and collaboration among diverse stakeholders.
Topic 4	Market potential	In this topic, participants will explore the market potential and economic opportunities associated with IS. They will discuss how IS initiatives can create competitive advantages for companies, reduce operational costs through resource efficiency, and contribute to sustainable development goals.

LEARNING UNIT 1.2.

CASE STUDIES

	Title	Summary
Introduction	Overview of diverse IS projects and initiatives across different industries and regions	In this introductory section, participants will explore an overview of various IS projects and initiatives implemented across different industries and regions in Europe. It sets the stage for the detailed case studies that follow.
Topic 1	Case studies: territorial approach	In this topic, participants will explore case studies of IS projects that have been implemented with a territorial approach. These case studies highlight how geographical proximity among different industries facilitates resource sharing and waste reduction strategies.
Topic 2	Case studies: industrial park approach	This topic focuses on case studies of IS projects implemented within industrial parks. Participants will examine how businesses co-located within these parks collaborate to achieve mutual benefits through resource exchange and symbiotic relationships.
Topic 3	Case studies: company approach	Participants will explore case studies of IS projects initiated by individual companies in this topic. These studies showcase how companies identify and capitalize on opportunities for IS within their operations and with their business partners.

Topic 4	Analysis of key factors contributing to the success of IS projects	This topic involves analysing critical factors that contribute to the success of IS projects. Participants will examine factors such as leadership, collaboration among stakeholders, regulatory support, and technological innovation. The analysis aims to identify key drivers that enable effective implementation and sustainability of IS initiatives.
Topic 5	Lessons learned, including challenges and best practices	Participants will review lessons learned from IS case studies in this topic. The discussion will encompass challenges encountered during IS project implementation, as well as best practices identified for overcoming these challenges. Insights gained from these lessons will provide valuable guidance for future IS projects.

LEARNING UNIT 1.3.

BENEFITS AND BARRIERS

Title		Summary
Introduction	Benefits and barriers in IS	This introduction provides an overview of the benefits and barriers associated with IS.
Topic 1	Economic benefits	This topic explores the economic benefits of IS, including increased efficiency, cost savings, and new revenue streams generated through symbiotic relationships.
Topic 2	Environmental benefits	This topic discusses the environmental benefits of IS, focusing on reduced waste generation, lower energy consumption, and other sustainable practices within IS frameworks.
Topic 3	Social benefits	This topic examines the social benefits of IS, highlighting improvements in community relations, enhanced local employment opportunities, and social sustainability impacts.
Topic 4	Common barriers to IS adoption	This topic identifies common barriers to IS adoption, such as resistance to change, regulatory challenges, and high initial investment costs.
Topic 5	Strategies for overcoming barriers	This topic explores strategies for overcoming barriers to IS adoption and maximizing its benefits, including effective change management, stakeholder engagement, and leveraging policy support.

LEARNING UNIT 1.4.

RESOURCES AND PROCESSES

Title		Summary
Introduction	IS resources and processes	This introduction provides an overview of resources and processes in IS, exploring how different types of resources are interconnected within IS frameworks.
Topic 1	Types of resources involved in IS and their circularity	This topic explores the types of resources essential to IS (materials, energy, water, and waste streams) and how these resources circulate across interconnected industries.
Topic 2	Water management	This topic explores strategies and practices for efficient water management in industrial settings within the context of IS.

Topic 3	Waste and materials management	This topic discusses strategies for managing materials derived from waste and implementing zero waste strategies within IS initiatives.
Topic 4	Energy management	This topic examines strategies to manage and optimize the use of various types of energy derived from surplus resources within IS frameworks.

LEARNING UNIT 1.5.

STAKEHOLDERS

	Title	Summary
Introduction	Stakeholders in IS	This introduction provides an overview of stakeholders in IS, highlighting their importance within IS networks.
Topic 1	Identification of key stakeholders in IS networks	This topic focuses on the identification of key stakeholders in IS networks.
Topic 2	Stakeholders' roles and responsibilities	This topic discusses the roles and responsibilities of stakeholders in IS networks, emphasizing their contributions to successful IS operations.
Topic 3	Stakeholders' engagement strategies	This topic explores effective strategies for engaging stakeholders in IS networks. Participants will learn methods to foster collaboration, communication, and mutual understanding among stakeholders to enhance the success of IS initiatives.

MODULE 2A

DESIGNING INDUSTRIAL SYMBIOSIS PROJECTS

LU 2A.1.

Understanding IS planning and the role of the facilitator

- **Introduction**
Overview of IS planning and the role of the facilitator⁷
- **Topic 1**
Definition of IS planning and its significance
- **Topic 2**
Systemic vision in IS planning

LU 2A.2.

Data analysis for resource mapping

- **Introduction**
Overview of data analysis for resource mapping in IS projects⁸
- **Topic 1**
Importance of data analysis in resource mapping
- **Topic 2**
Data collection methods and sources
- **Topic 3**
Techniques for analysing and visualizing resource data
- **Topic 4**
Interpreting analysis results to identify potential synergies and opportunities

LU 2A.3.

Opportunities identification and prioritisation

- **Introduction**
Overview of identifying and prioritizing IS opportunities⁹
- **Topic 1**
Identifying potential synergies and opportunities
- **Topic 2**
Methodologies for identify and prioritise opportunities

LU 2A.4.

Circular Economy and governance

- **Introduction**
Governance structures and mechanisms for managing IS projects
- **Topic 1**
Governance structures and mechanisms
- **Topic 2**
Legal and regulatory considerations for governing IS projects

⁷ Stakeholder's suggestion: highlight the work of intermediate actors (Tech centres, clusters, consultancies...) to interconnect different industries/companies as facilitators of IS projects (optional)

⁸ Stakeholder's suggestion: aligned with "resource mapping" add "technological watch" (optional)

⁹ Stakeholder's suggestion: add tools for project design (optional)

LEARNING OUTCOMES

Knowledge	Skills	Competencies
<i>The learner understands...</i>	<i>The learner is empowered to...</i>	<i>The learner conducts the following tasks:</i>
<ul style="list-style-type: none"> • Understanding of IS planning and its role • Methodologies and techniques for mapping materials, energy, and water flows • Methodologies and strategies for identifying and prioritizing opportunities in IS • Criteria for assessing territory readiness and sector compatibility in IS planning • Governance structures and mechanisms for managing IS projects at different levels 	<ul style="list-style-type: none"> • Analyse IS planning strategies • Interpret data analysis results to prioritize potential synergies identified through resource mapping • Apply techniques for visualizing resource data • Identify and prioritize synergistic opportunities • Implement governance frameworks to effectively manage and coordinate IS projects 	<ul style="list-style-type: none"> • Utilize systemic vision to identify and leverage opportunities • Utilize data collection methods to gather relevant information on resource inputs and outputs • Identify potential synergies and opportunities among industries within specific territories • Prioritize IS opportunities based on feasibility, impact, and strategic importance • Collaborate with stakeholders to define clear roles and responsibilities in governing IS initiatives

Key words

IS planning, facilitator role, systemic vision, symbiotic relationships, synergies, opportunities, responsibilities, data analysis, resource mapping, materials, energy, water flows, data collection, resource inputs, outputs, data visualization, opportunities identification, prioritization, industries, governance, stakeholders, regulatory frameworks.

CONTENT DESCRIPTION

LEARNING UNIT 2A.1.

UNDERSTANDING IS PLANNING & THE ROLE OF THE FACILITATOR

	Title	Summary
Introduction	Overview of IS planning and the role of the facilitator	This introduction provides an overview of IS planning, the role of the facilitator, and the importance of a systemic vision in identifying opportunities for IS exchanges.
Topic 1	Definition of IS planning and its significance	This topic defines IS planning and explores its critical role in fostering symbiotic relationships between industrial entities, crucial for successful IS projects. It also covers the responsibilities and key functions of the IS Planner, highlighting their role in coordinating IS initiatives and facilitating collaboration among stakeholders to enhance project outcomes.

Topic 2	Systemic vision in IS planning	This topic delves into systemic vision in IS planning, highlighting its pivotal role in identifying synergies and opportunities for resource exchange and collaboration among industries.
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LEARNING UNIT 2A.2.

DATA ANALYSIS FOR RESOURCE MAPPING

Title		Summary
Introduction	Overview of data analysis for resource mapping in IS projects	This introduction provides an overview of the importance and methodologies of data analysis for resource mapping in IS projects, essential for identifying potential synergies and optimizing resource use.
Topic 1	Importance of data analysis in resource mapping	This topic emphasizes the significance of data analysis in mapping materials, energy, and water flows to uncover opportunities for symbiotic relationships in IS projects.
Topic 2	Data collection methods and sources	This topic explores methods and sources for collecting relevant data on resource inputs, outputs, and flows within industries, critical for accurate resource mapping and analysis.
Topic 3	Techniques for analysing and visualizing resource data	This topic covers techniques for analyzing and visualizing resource data to identify potential synergies and opportunities for IS projects, enhancing decision-making and planning processes.
Topic 4	Interpretation of data analysis results	This topic focuses on interpreting data analysis results to prioritize potential synergies identified through resource mapping in IS initiatives.

LEARNING UNIT 2A.3.

OPPORTUNITIES IDENTIFICATION AND PRIORITIZATION

Title		Summary
Introduction	Overview of identifying and prioritizing IS opportunities	This introduction provides an overview of methodologies and strategies for identifying and prioritizing opportunities in IS, ensuring effective planning and implementation.
Topic 1	Identifying potential synergies and opportunities	This topic focuses on identifying potential synergies and opportunities among industries within specific territories, aiming for mutual benefits and optimal resource utilization through IS.
Topic 2	Methodologies for identify and prioritise opportunities	This topic examines methodologies for identifying IS opportunities, including assessing territory readiness, sector compatibility, and estimating metabolic flows to enhance resource efficiency. It also discusses strategies for focusing IS planning efforts by identifying key sectors with high potential for IS and prioritizing opportunities based on feasibility and strategic importance.

LEARNING UNIT 2A.4.

CIRCULAR ECONOMY AND GOVERNANCE

Title	Summary
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Introduction	To governance structures and mechanisms for managing IS projects	This introduction provides an overview of governance frameworks, structures, and mechanisms crucial for effectively managing IS projects and fostering sustainable practices.
Topic 1	Governance structures and mechanisms	This topic analyzes governance structures and mechanisms at local, regional, and national levels, emphasizing their role in structured management and coordination of IS initiatives. It also examines the roles and responsibilities of stakeholders in governing IS initiatives, highlighting collaborative efforts and clear delineation of roles to enhance project efficiency.
Topic 2	Legal and regulatory considerations	This topic provides insights into legal and regulatory considerations governing IS projects, focusing on compliance with laws, regulations, and the development of supportive policies for IS initiatives.

MODULE 2B

MANAGING INDUSTRIAL SYMBIOSIS PROJECTS

LU 2B.1.
The IS "Intrapreneur"

- **Introduction**
Overview of the role of an IS "Intrapreneur" as an IS project manager within a company
- **Topic 1**
Definition of IS project manager and its role
- **Topic 2**
Characteristics of an IS project manager
- **Topic 3**
Analysis of IS projects within a company context

LU 2B.2.
IS Business models

- **Introduction**
Business models in IS
- **Topic 1**
Overview of different business models for IS projects
- **Topic 2**
Examples of circular economy business models applied in IS

LU 2B.3.
Monitoring and Impacts calculations

- **Introduction**
Overview of monitoring and impacts calculation in IS projects¹⁰
- **Topic 1**
Importance of monitoring and evaluation in assessing the performance and impact of IS projects
- **Topic 2**
Development of key performance indicators (KPIs) for measuring IS project impacts
- **Topic 3**
Impact calculation tools and methodologies

LU 2B.4.
Reporting and certifications

- **Introduction**
Overview of reporting and certification in IS¹¹
- **Topic 1**
Overview of Environmental, Social, and Governance (ESG) criteria and their relevance to IS projects
- **Topic 2**
Consideration of Sustainable Development Goals (SDGs) and international frameworks in IS project planning
- **Topic 3**
Certification schemes and standards for assessing IS project sustainability performance

¹⁰ Stakeholder's suggestion: to verify the environmental impact, it is very important to classify the leader of the industrial supply chain according to the Taxonomy Regulation 2020/852. For sustainability reporting purposes, it is essential for SMEs to refer to EFRAG's Draft V_SME - The document includes three standard forms that the SME enterprise can use as a basis for the preparation of its sustainability report (optional).

¹¹ Stakeholder's suggestion: add quantitative relationship with Climate Change and Sustainable Development Goals (optional).

LEARNING OUTCOMES

Knowledge	Skills	Competencies
<i>The learner understands...</i>	<i>The learner is empowered to...</i>	<i>The learner conducts the following tasks:</i>
<ul style="list-style-type: none"> • The significance of IS "Intrapreneurship" within a company • Business models in IS project planning • Strategies for monitoring and impacts calculations in IS initiatives • Methodologies of reporting and certification in IS projects 	<ul style="list-style-type: none"> • Identify the characteristics of an IS Intrapreneur • Apply business models to IS projects • Utilize key performance indicators (KPIs) for measuring IS project impacts. • Understand the importance of reporting and certification in IS projects 	<ul style="list-style-type: none"> • Understand the role and characteristics of an IS "Intrapreneur" • Apply business models effectively for IS projects • Apply monitoring and impacts calculations within IS initiatives • Develop reporting and certification strategies for IS projects.

Key words

IS project manager, intrapreneurship, societal impact, scalability, business models, monitoring, impacts calculation, evaluation, performance assessment, Key Performance Indicators (KPIs), impact measurement, tools, methodologies, ESG criteria, reporting, certification, Sustainable Development Goals (SDGs), European frameworks.

CONTENT DESCRIPTION

LEARNING UNIT 2B.1.

THE IS "INTRAPRENEUR"

Title		Summary
Introduction	Overview of the role of an IS "Intrapreneur" as an IS project manager within a company	This introduction explains the concept of an IS "Intrapreneur," emphasizing their role as innovators within the company and their contribution to sustainability through entrepreneurial initiatives.
Topic 1	Definition of an IS project manager and its role	This topic defines the role of an IS project manager within a company, highlighting their entrepreneurial mindset. It discusses their responsibilities in identifying and pursuing IS opportunities, leading sustainability initiatives, and fostering a culture of innovation.
Topic 2	Characteristics of an IS project manager	This topic examines the qualities and attributes commonly associated with IS project managers, essential for effective leadership and project success.
Topic 3	Analysis of IS projects within a company context	This topic explores how IS projects can be analysed within the company context, considering their societal and territorial impact. It emphasizes assessing scalability and potential expansion opportunities based on the project's outcomes and contributions to broader sustainability goals.

LEARNING UNIT 2B.2.

IS BUSINESS MODELS

Title		Summary
Introduction	Business models in IS	This introduction provides an overview of business models within the context of IS. It introduces the concept and explains how different business models are applied to IS projects, laying the groundwork for deeper exploration in subsequent topics.
Topic 1	Overview of different business models for IS projects	This topic provides an overview of the diverse range of business models utilized in IS projects. It explores various approaches and frameworks for structuring IS initiatives, highlighting key characteristics and considerations associated with each model.
Topic 2	Examples of circular economy business models applied in IS	This topic examines real-world examples of CE business models implemented within the context of IS. It showcases successful applications of circular economy principles in IS projects, illustrating innovative approaches to resource management and value creation.

LEARNING UNIT 2B.3.

MONITORING AND IMPACTS CALCULATIONS

Title		Summary
Introduction	Overview of monitoring and impacts calculation in IS projects	This introduction provides an overview of monitoring and impact assessment within the context of IS projects. It explains the essential components of these processes and highlights why monitoring and evaluation are crucial for assessing the performance and impact of IS initiatives. This section sets the stage for deeper exploration in subsequent topics.
Topic 1	Importance of monitoring and evaluation in assessing the performance and impact of IS projects	This topic discusses the significance of monitoring and evaluation processes in measuring the performance and impact of IS projects. It explores the rationale behind these efforts, emphasizing their role in providing insights for continuous improvement and informed decision-making.
Topic 2	Development of key performance indicators (KPIs) for measuring IS project impacts	This topic delves into the process of developing Key Performance Indicators (KPIs) specifically tailored to measure the impacts of IS projects. It explores the selection, design, and implementation of KPIs to effectively measure the outcomes and achievements of IS initiatives.
Topic 3	Impact calculation tools and methodologies	This topic explores various tools and methodologies used for calculating the impacts of IS projects. It introduces different approaches and techniques for quantifying and assessing the environmental, economic, and social impacts generated by IS initiatives, enhancing understanding and decision-making processes.

LEARNING UNIT 2B.4.

REPORTING AND CERTIFICATIONS

	Title	Summary
Introduction	Overview of reporting and certification in IS	This introduction provides an overview of reporting and certifications in IS projects. It sets the stage for deeper exploration into specific frameworks and standards used in subsequent topics.
Topic 1	Overview of Environmental, Social, and Governance (ESG) criteria and their relevance to IS projects	This topic explores the integration of Environmental, Social, and Governance (ESG) criteria into IS initiatives. It discusses how these criteria contribute to sustainable practices, ethical considerations, and responsible business conduct within IS projects.
Topic 2	Consideration of Sustainable Development Goals (SDGs) and international frameworks in IS project planning	This topic examines the alignment of IS projects with the Sustainable Development Goals (SDGs) and international frameworks. It emphasizes how IS initiatives can contribute to global sustainability targets, socio-economic development, and environmental conservation.
Topic 3	Certification schemes and standards for assessing IS project sustainability performance	This topic investigates certification schemes and standards used to evaluate the sustainability performance of IS projects. It introduces various certification programs that recognize and promote sustainable practices, fostering trust and accountability within IS partnerships.

MODULE 3

LEGAL AND FINANCIAL ISSUES

LU 3.1.
Regulation and legal framework

- **Introduction**
Overview of EU policies¹²
- **Topic 1**
Policy framework in Europe
- **Topic 2**
Policy instruments for IS

LU 3.2.
Financing resources for IS projects

- **Introduction**
IS financing¹³
- **Topic 1**
Public funding for IS initiatives
- **Topic 2**
Private investment for IS initiatives
- **Topic 3**
Public-Private Partnerships (PPPs)

LEARNING OUTCOMES

Knowledge	Skills	Competencies
<i>The learner understands...</i>	<i>The learner is empowered to...</i>	<i>The learner conducts the following tasks:</i>
<ul style="list-style-type: none"> • The evolution and key principles of EU policies enabling IS • IS as a policy tool in achieving sustainability and circular economy goals within the European Union • Sources of public funding and private investment available for IS initiatives in the European context. 	<ul style="list-style-type: none"> • Analyse the different levels (macro, meso, micro) of policy instruments supporting industrial symbiosis across Europe. • Evaluate different types of public and private funding mechanisms. • Evaluate the implications of EU regulatory frameworks and directives on promoting IS initiatives. 	<ul style="list-style-type: none"> • Formulate strategies to navigate and comply with EU regulations and legal frameworks that facilitate IS initiatives. • Develop funding proposals for IS projects, integrating knowledge of public and private financing options • Collaborate effectively in public-private partnerships (PPPs) to leverage combined resources and expertise for scaling IS initiatives.

Key words

EU policies, Policy instruments, Public funding, Private investment, Public-Private Partnerships (PPPs), Regulatory frameworks, Compliance, Sustainability goals, EU directives and regulations, Grants and subsidies, EU funding programs, Venture capital, Impact investing, Risk assessment, Return on investment (ROI), Financial sustainability, Funding proposals, Collaborative financing models, Sustainable finance, Economic incentives, Resource-efficient business models.

¹² Stakeholder's suggestion: add international cooperation in IS (cross border cooperation with different legal framework) (optional).

¹³ Stakeholder's suggestion: add support system / institutions, information available... (optional).

CONTENT DESCRIPTION

LEARNING UNIT 3.1.

REGULATION AND LEGAL FRAMEWORK

Title		Summary
Introduction	Overview of EU policies	This introduction provides an overview of EU policies that enable industrial symbiosis, emphasizing sustainable operations, innovative use of materials and energy, and digital transformation.
Topic 1	Policy framework in Europe	This topic discusses the evolution and significance of IS as a policy tool in achieving sustainability and circular economy goals in the EU.
Topic 2	Policy instruments for IS	This topic describes various policy instruments at different levels (macro, meso, micro) that promote IS across Europe. Includes direct supports as well as indirect supports.

LEARNING UNIT 3.2.

FINANCING RESOURCES FOR CE AND IS PROJECTS

Title		Summary
Introduction	IS financing	This introduction provides an overview of financing resources for CE and IS projects, highlighting the importance of financial support in driving sustainable initiatives.
Topic 1	Public funding for IS initiatives	This topic discusses various sources of public funding available for IS initiatives and emphasizes the role of public finance in supporting IS projects
Topic 2	Private investment for IS initiatives	This topic explores the role of private sector investment in funding IS initiatives. Covers different types of private financing and discusses the motivations for private investors to support IS projects and the potential benefits for businesses involved.
Topic 3	Public-Private Partnerships (PPPs)	This topic focuses on the collaborative models between public and private sectors in financing IS projects. Highlights examples of successful PPPs in promoting sustainable practices and leveraging combined resources for larger scale IS initiatives. Discusses the advantages, challenges, and best practices for establishing effective PPPs in the context of CE and IS.

MODULE 4

COMMUNICATION AND SOFT SKILLS

LU 4.1.
Communication in IS

- **Introduction**
Importance of effective communication in IS
- **Topic 1**
Key ideas to boost the CE and IS through communication
- **Topic 2**
Communication examples
- **Topic 3**
Networking sessions

LU 4.2.
Soft skills needed in IS

- **Introduction**
Overview of essential soft skills for IS professionals
- **Topic 1**
Soft skills needed in IS
 - System thinking
 - Cooperation & collaboration skills
 - Autonomy
 - Networking skills
 - Interpersonal skills
 - Effective communication skills
 - Project management

LEARNING OUTCOMES

Knowledge	Skills	Competencies
<p><i>The learner understands...</i></p> <ul style="list-style-type: none"> • Concepts and significance of communication in CE and IS • Strategies and examples for effective communication in CE and IS • Strategies for organizing networking sessions in IS initiatives • Key soft skills essential for IS professionals 	<p><i>The learner is empowered to...</i></p> <ul style="list-style-type: none"> • Define effective communication strategies in CE and IS • Identify stakeholders and engage them appropriately • Design and facilitate networking sessions • Demonstrate interpersonal skills necessary for building and maintaining relationships in IS environments. 	<p><i>The learner conducts the following tasks:</i></p> <ul style="list-style-type: none"> • Design communication strategies tailored to CE and IS contexts • Organize effective networking sessions for IS • Manage disagreements and challenges in IS projects through soft skills.

Key words

Effective communication, collaboration, stakeholder engagement, digital tools, barriers, public relations, media engagement, campaigns, soft skills, system thinking, strategic management.

CONTENT DESCRIPTION

LEARNING UNIT 4.1.

COMMUNICATION IN IS

Title		Summary
Introduction	Importance of effective communication in IS	In this introductory section, participants will learn about the crucial role that effective communication plays in the success of IS initiatives. We will discuss the concepts and significance of communication within the context of CE and IS, highlighting how clear, strategic communication can enhance collaboration, stakeholder engagement, and the overall impact of IS projects.
Topic 1	Key ideas to boost the CE and IS through communication	This topic will delve into essential ideas and strategies for promoting CE and IS through effective communication. Participants will learn to design communication strategies tailored specifically to CE and IS contexts.
Topic 2	Communication examples	Participants will be introduced to real-world examples of successful communication strategies within the CE and IS domains. By analysing examples, participants will gain insights into what makes a communication strategy effective. This topic will help participants understand how to adapt successful elements from these examples into their own communication plans, enhancing their ability to engage stakeholders and promote IS initiatives effectively.
Topic 3	Networking sessions	This topic introduces participants to the handbook on "How to set up networking sessions" ¹⁴ within the context of IS. Participants will learn practical strategies for organizing effective networking sessions.

LEARNING UNIT 4.2.

SOFT SKILLS NEEDED IN IS

Title		Summary
Introduction	Overview of essential soft skills for IS professionals	In this introductory section, participants will learn about the role of soft skills in the context of IS and emphasizing their importance in achieving IS goals. This section provides an overview of essential soft skills needed for IS professionals and highlights the significance of developing these skills for effective collaboration.
Topic 1	Soft skills needed in IS	In this topic, we will explore the critical soft skills required for IS professionals. These include system thinking, which helps in understanding and navigating complex information systems; cooperation and collaboration skills, essential for effective teamwork; and autonomy, which allows for independent

¹⁴ Related to WP3-A5 Handbook "How to set up Networking Sessions" (UNISTRA)

		<p>decision-making and responsibility. We will also discuss networking skills for building professional relationships, interpersonal skills for effective interaction, effective communication skills for clear and concise information exchange, and project management skills for planning and executing projects efficiently. Each skill will be elaborated on with examples and practical tips for development and application in the IS field.</p>
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5. Conclusions

In this concluding section, we provide an overview of the key insights derived from the INSET training program. Central to this discussion is an examination of the structure of the Joint Curriculum, which outlines the modules, learning units, and pathways designed to equip participants with essential knowledge and skills in IS.

- The INSET training course is designed as a comprehensive 25-hour online training program supplemented by an additional 75 hours of self-directed learning, resulting in a **total learning time of 100 hours**, equivalent to **4 credits** based on the European Credit Transfer and Accumulation System (ECTS).
- Based on identified learning outcomes, Joint Curriculum comprises **five learning modules**, each tailored to address specific aspects of IS. There is an **introductory module** that serves as a guide for the course.
- Participants can choose between **two pathways** (IS Planner or IS Project Manager), each emphasizing distinct competencies and skills relevant to their roles.
- Modules are structured to ensure comprehensive coverage of **theoretical concepts** and **practical applications**. The course methodology leverages **e-learning** benefits.
- The modular format allows for **flexible learning** and self-paced progression, accommodating diverse learning preferences and schedules. Learners can choose modules based on their interests and follow any sequence, though a linear progression is recommended for comprehensive learning.
- A system tracks module completion progress, with learners required to achieve at least **80% on quizzes** to earn a **certificate**.
- The curriculum is aligned with the European Qualifications Framework (**EQF**) **Level 5**, indicating high-level specialized knowledge and competencies.

The structured approach of the Joint Curriculum ensures alignment with European Qualifications Framework (EQF) standards, fostering comprehensive learning outcomes for both IS Planner and IS Project Manager profiles. Below is a table outlining the complete structure of the Joint Curriculum:

Table 3. Structure of the complete INSET Joint Curriculum¹⁵

Structure of the Joint Curriculum		Self-assessment	Learning pathway		Duration (hours)	Credits
			IS Planner	IS Project Manager		
MODULE 0	Introduction to the course		X	X	4	0.16
	Guide of the training program				4	
MODULE 1	General context of IS				24	0.96
LU 1.0.	Introduction	Multiple choice / True false / Fill-in-the-gaps	X	X	2	
LU 1.1.	What is IS				4	
LU 1.2.	Case studies in IS				6	
LU 1.3.	Benefits and barriers of IS				4	
LU 1.4.	Resources and processes in IS				4	
LU 1.5.	Stakeholders in IS				4	
MODULE 2A	Designing IS projects				24	0.96
LU 2A.0.	Introduction	Multiple choice / True false / Fill-in-the-gaps	X		2	
LU 2A.1.	Understanding IS planning & the role of the facilitator				5	
LU 2A.2.	Opportunities identification and prioritization				6	
LU 2A.3.	Data analysis for resource mapping				6	
LU 2A.4.	CE and governance				5	
MODULE 2B	Managing IS projects				24	0.96
LU 2B.0.	Introduction	Multiple choice / True false / Fill-in-the-gaps		X	2	
LU 2B.1.	The IS Intrapreneur				4	
LU 2B.2.	IS business models				6	
LU 2B.3.	Monitoring and impact calculation				6	
LU 2B.4.	Reporting and certifications				6	
MODULE 3	Legal and financial issues				12	0.48
LU 3.0.	Introduction	Multiple choice / True false / Fill-in-the-gaps	X	X	2	
LU 3.1.	Regulation & legal framework				5	
LU 3.2.	Financing resources for CE and IS projects				5	
MODULE 4	Communication and soft skills				12	0.48
LU 4.0.	Introduction	Multiple choice / True false / Fill-in-the-gaps	X	X	2	
LU 4.1.	Communication in IS				5	
LU 4.2.	Soft skills needed in IS				5	
IS Planner profile pathway					76	3
IS Project Manager profile pathway					76	3
Complete training course (no specific pathway)					100	4

¹⁵ The duration and detailed content of each module can change and be redefined when the consortium works collaboratively on the modules.

Annex 1: Learning Outcomes for the IS Manager and IS Project Manager

IS Planner profile Learning Outcomes

Knowledge	Skills	Competencies
<i>The learner understands...</i>	<i>The learner is empowered to...</i>	<i>The learner conducts the following tasks...</i>
<ul style="list-style-type: none"> • Fundamental principles, diverse applications, and market potential opportunities of IS across different industries and regions. • Various types of IS networks and their characteristics. • Key factors influencing the success of IS projects, along with the challenges commonly faced during implementation. • Economic, environmental, and social benefits of IS • Types of resources involved in IS and sustainable resource management practices. • Effective stakeholder engagement strategies and the roles of key stakeholders in IS networks. • Methodologies and strategies for identifying, prioritizing, and mapping resource opportunities in IS, including techniques for visualizing resource data. • Criteria for assessing territory readiness and sector compatibility in IS planning. • Governance structures and mechanisms for managing IS projects at different levels. • Evolution and key principles of EU policies enabling IS 	<ul style="list-style-type: none"> • Define and scope IS, identifying its potential, applications • Evaluate different types of IS networks, case studies of IS projects, and the economic, environmental, and social benefits of IS. • Analyse lessons learned from IS case studies • Apply techniques for visualizing resource data to prioritize potential synergies. • Implement sustainable resource management practices • Implement governance frameworks to effectively manage and coordinate IS projects. • Identify and communicate effectively with various stakeholders, engaging them appropriately. • Design and facilitate networking sessions. • Analyse policy instruments supporting IS across different levels in Europe. • Evaluate various types of public and private funding mechanisms for IS initiatives. • Assess the implications of EU regulatory frameworks and 	<ul style="list-style-type: none"> • Define and conceptualize IS and CE, assessing market potential and identifying synergies between companies. • Analyse and evaluate different approaches to IS projects, identifying key success factors, challenges, • Categorize different types of resources essential to IS. • Manage and optimize resources and processes within IS frameworks, assessing benefits and barriers to IS adoption, and developing strategies to overcome challenges. • Utilize systemic vision and data collection methods to gather relevant information on resource inputs and outputs, identifying and leveraging opportunities among industries within specific territories. • Prioritize IS opportunities based on feasibility, impact, and strategic importance, collaborating with stakeholders to define clear roles and responsibilities in governing IS initiatives.

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- Sources of public funding and private investment available for IS initiatives in the European context.
 - Concepts and significance of communication in CE and IS, including strategies for organizing networking sessions.
 - Key soft skills essential for IS professionals
- directives on promoting IS initiatives.
 - Demonstrate interpersonal skills necessary for building and maintaining relationships in IS environments.
- Formulate strategies to navigate and comply with EU regulations and legal frameworks that facilitate IS initiatives.
 - Develop comprehensive funding proposals for IS projects, integrating knowledge of public and private financing options.
 - Design communication strategies tailored to CE and IS contexts, and organize effective networking sessions for IS.
 - Manage disagreements and challenges in IS projects through soft skills
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IS Project Manager profile Learning Outcomes

Knowledge	Skills	Competencies
<p><i>The learner understands...</i></p> <ul style="list-style-type: none"> • Fundamental principles, diverse applications, and market potential opportunities of IS across different industries and regions. • Various types of IS networks and their characteristics. • Key factors influencing the success of IS projects, along with the challenges commonly faced during implementation. • Economic, environmental, and social benefits of IS • Types of resources involved in IS and sustainable resource management practices. • Effective stakeholder engagement strategies and the roles of key stakeholders in IS networks. • The significance of IS "Intrapreneurship" 	<p><i>The learner is empowered to...</i></p> <ul style="list-style-type: none"> • Define and scope IS, identifying its potential, applications. • Evaluate different types of IS networks, case studies of IS projects, and the economic, environmental, and social benefits of IS. • Analyse lessons learned from IS case studies. • Identify the characteristics of an IS Intrapreneur • Apply business models to IS projects • Utilize key performance indicators (KPIs) for measuring IS project impacts. • Understand the importance of reporting and certification in IS projects. 	<p><i>The learner conducts the following tasks...</i></p> <ul style="list-style-type: none"> • Define and conceptualize IS and CE, assessing market potential and identifying synergies between companies. • Analyse and evaluate different approaches to IS projects, identifying key success factors and challenges. • Apply business models effectively for IS projects and apply monitoring and impacts calculations within IS initiatives. • Develop reporting and certification strategies for IS projects. • Formulate strategies to navigate and comply with EU regulations and legal

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- Business models in IS project planning.
 - Strategies for monitoring and impacts calculations in IS initiatives.
 - Methodologies of reporting and certification in IS projects.
 - Evolution and key principles of EU policies enabling IS
 - Sources of public funding and private investment available for IS initiatives in the European context.
 - Concepts and significance of communication in CE and IS, including strategies for organizing networking sessions.
 - Key soft skills essential for IS professionals
- Analyse policy instruments supporting IS across different levels in Europe.
 - Evaluate various types of public and private funding mechanisms for IS initiatives.
 - Assess the implications of EU regulatory frameworks and directives on promoting IS initiatives.
 - Identify and communicate effectively with various stakeholders, engaging them appropriately.
 - Design and facilitate networking sessions.
 - Demonstrate interpersonal skills necessary for building and maintaining relationships in IS environments.
- frameworks that facilitate IS initiatives.
 - Develop comprehensive funding proposals for IS projects, integrating knowledge of public and private financing options.
 - Design communication strategies tailored to CE and IS contexts, and organize effective networking sessions for IS.
 - Manage disagreements and challenges in IS projects through soft skills
-

Annex 2: EQF and NQF

European Qualifications Framework (EQF)

The European Qualifications Framework (EQF) was established in 2008 with the objective of enhancing the transparency, comparability, and transferability of individuals' qualifications across Europe. It functions as a common reference framework, outlining qualifications in terms of learning outcomes at progressively advanced levels of proficiency. The EQF serves as a tool for aligning different national qualifications systems within the EU, benefiting a wide range of stakeholders including learners, employees, job seekers, employers, educational institutions, accreditation bodies, governmental authorities, and international organizations.

The EQF categorizes learning outcomes into three main areas:

- Knowledge encompasses the understanding and assimilation of concepts, principles, theories, and practices acquired through various avenues such as formal education, workplace experiences, and personal endeavours;
- Skills can be either cognitive or practical, reflecting an individual's ability to perform specific tasks or solve problems;
- Competences are characterized by their level of complexity, autonomy, and responsibility, representing an individual's capacity to apply acquired knowledge and skills effectively in practical contexts.

The EQF comprises eight levels, each delineating the progression of knowledge, skills, and competences:

Table 4. The 8 levels of the EQF¹⁶

Level	Knowledge	Skills	Competences
1	Basic general knowledge	Basic skills required to carry out simple tasks	Work or study under direct supervision in a structured context
2	Basic factual knowledge of a field of work or study	Basic cognitive and practical skills required to use relevant information to carry out tasks and to solve routine problems using simple rules and tools	Work or study under supervision with some autonomy
3	Knowledge of facts, principles, processes, and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	Take responsibility for completion of tasks in work or study; adapt own behaviour to circumstances in solving problems
4	Factual and theoretical knowledge in broad contexts within a field of work or study	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
5	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study, and an awareness of the boundaries of that knowledge	A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems.	Exercise management and supervision in contexts of work or study activities where there is unpredictable change. Review and develop performance of self and others.
6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	Manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups

7	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research Critical awareness of knowledge issues in a field and at the interface between different fields	Specialised problem-solving skills required in research and/or innovation to develop new knowledge and procedures and to integrate knowledge from different fields	Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches; take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
8	Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	The most advanced and specialized skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	Demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity, and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

Considering the diverse national qualification frameworks across EU member states, the EQF plays a crucial role in fostering greater consistency and coherence.

National Qualification Frameworks (NQF)

In this section, we explore the National Qualification Frameworks (NQFs) of the partner countries involved in the INSET project. These NQFs are tailored to the educational and vocational landscapes of their respective countries and play a crucial role in ensuring that qualifications obtained within these contexts are recognized and understood within the respective countries and internationally.

We will delve into the specifics of the NQFs in the partner countries, examining how they intersect with the EQF and contribute to the harmonization of learning outcomes for our INSET course. By understanding the intricacies of these national frameworks, we can effectively align our course objectives with the educational standards and requirements of each partner country.

¹⁶ <https://europa.eu/europass/en/description-eight-eqf-levels>

National Qualification Framework in Spain

The Spanish Qualifications Framework for Lifelong Learning (MECU – Marco Español de Cualificaciones para el Aprendizaje Permanente), established through a royal decree in 2022, comprises eight levels encompassing all formal education and training types. It's currently in the adoption phase. In 2014, the Spanish Qualifications Framework for Higher Education (MECES) was created and self-certified against the European Higher Education Area (EHEA) frameworks.

MECU, aligned with the European Qualifications Framework (EQF), emphasizes learning outcomes across its eight levels. Descriptors, akin to the EQF, outline knowledge, skills, and autonomy and responsibility. Notably, analytical skills and multilingual communication are highlighted, with competence defined to include learning skills and attitudes. The top four levels align with MECES cycles, with Levels 4 and 5 further divided into sublevels A, B, and C.

Sublevels 4A and 5A comprise qualifications combining general and vocational education, leading to the next MECU level. Professional qualifications not advancing to the next MECU level fall under sublevels 4B and 5B. Specialization courses, not advancing to higher MECU levels, reside in sublevels 4C and 5C, requiring qualifications from sublevels 4A or 5A for enrolment. MECU Level 3 includes only sublevels 3A and 3B.

MECU encompasses EQF's eight levels, with Levels 5 to 8 equivalent to MECES's four levels. It encompasses formal qualifications from general education, initial VET, higher education, and professional certificates. The latter can be acquired through adult learning/continuing training and by validating non-formal and informal learning. Advanced VET at MECU Level 5, considered non-university higher education, encourages lifelong learning outside the university system. Proper alignment of subjects/learning outcomes may warrant recognition for university admission and ECTS credits.

Table 5. Spanish qualifications framework (MECU)¹⁷

MECU Level	MECES level	Qualification	QF-EHEA
1		Certificate of primary education	

¹⁷ Cedefop (2023). European Inventory of National Qualifications Frameworks 2022 – Spain https://www.cedefop.europa.eu/files/spain_-_european_inventory_of_nqfs_2022.pdf

2		Official certificate of passing the second year of compulsory secondary education Certificate of vocational training programmes for pupils with special educational needs or other vulnerable groups, regulated under the provisions of Royal Decree 127/2014	
3		A – Graduate Degree in Compulsory Secondary Education A – Basic Professional Technician Degree B – Professional Certificate level 1	
4		A – Baccalaureate degree A – Professional technician's degree A – Professional music teaching technician's degree A – Professional dance teaching technician's degree A – Visual arts and design technician's degree A – Degree of Technician in Sports B – Professional Certificate level 2 C – Specialization courses in vocational training of the educational system that requires holding a Degree of Professional Technician	
5	1	A – Advanced professional technician's degree A – Advanced sports technician's degree A – Advanced visual arts and design technician's degree B – Professional certificate level 3 C – Specialisation courses in vocational training in the education system that requires holding an advanced professional technician's degree	Short cycle
6	2	Bachelor's degree Advanced degree in higher artistic education	First cycle
7	3	Master's degree Master's degree in artistic education Bachelor's degree of at least 300 ECTS credits comprising at least 60 ECTS credits at master's level, obtaining the level of qualification through the Council of Universities	Second cycle
8	4	Doctoral degree	Third cycle

National Qualification Framework in France

The French National Professional Qualifications Framework (NPQF), part of the first generation of EQFs, was introduced in 2018 with eight levels. Each level is defined by descriptors focusing on the complexity of knowledge, level of expertise, and degree of responsibility and autonomy. This framework encompasses qualifications from general upper secondary, vocational, professional, and higher education, as well as those awarded outside formal education and training.

The NPQF was referenced to the EQF in 2021 and aligned with the Qualifications Framework of the European Higher Education Area (QF-EHEA). Its descriptors, while similar to the EQF, incorporate national specificities. For instance, "expertise" is emphasized over "skills" to underscore competence evaluation and operational dimension.

Level 1 of the NPQF, focusing on basic knowledge mastery, lacks descriptors and qualifications. Level 2 covers simple activities with limited autonomy, while levels 3 to 8 integrate qualifications previously categorized within the five levels of the National Register of Vocational and Professional Qualifications (RNCP).

The NPQF's development was significantly influenced by EQF levels, replacing older criteria based on labor market elements and study duration. It's an inclusive framework, accepting qualifications with clear professional relevance from vocational education and higher education. General and technological baccalaureates are acknowledged at level 4, despite lacking professional context, due to labour market recognition and university entry legitimacy.

Table 6. National professional qualifications frameworks (NPQR)¹⁸

NQF level	Qualification type	EQF level
1	-	1

¹⁸ Cedefop (2023). European Inventory of National Qualifications Frameworks 2022 – France. <https://www.cedefop.europa.eu/en/country-reports/france-european-inventory-nqfs-2022>

2	Currently no qualifications	2
3	<p>Secondary vocational certificates</p> <p>Secondary vocational certificates in agriculture</p> <p>Secondary vocational certificate for youth, adult education and sports</p> <p>Certificate issued by the Chambers of Trades and Crafts</p> <p>Secondary vocational certificates at level 4</p> <p>Professional certificates/titles – level 3</p> <p>Professional qualification certificates – level 3</p> <p>Professional qualifications on demand – level 3</p>	3
4	<p>National baccalaureate diploma – general, technological or vocational education</p> <p>Applied arts certificates</p> <p>Professional certificate for youth, adult education and sports</p> <p>Higher technical diploma in craftsmanship</p> <p>Secondary vocational certificates at level 4</p> <p>Professional certificates/titles – level 4</p> <p>Professional qualification certificates – level 4</p> <p>Professional qualifications on demand – level 4</p>	4
5	<p>Undergraduate technician certificates</p> <p>Undergraduate technician certificates in agriculture</p> <p>Undergraduate diploma in technology</p> <p>National diploma 'One of the best workers in France'</p> <p>National diplomas at level 5</p> <p>Professional certificates/titles – level 5</p> <p>Professional qualification certificates – level 5</p> <p>Master craftsman qualifications issued by the Chambers of Trades</p> <p>Professional qualifications on demand – level 5</p>	5
6	<p>Bachelor's degrees</p> <p>Bachelor's</p> <p>University bachelor's in technology</p> <p>National diploma in arts</p> <p>National diplomas at level 6</p> <p>Professional certificates/titles – level 6</p> <p>Professional qualification certificates – level 6</p> <p>Professional qualifications on demand – level 6</p>	6
7	<p>Master's degrees</p> <p>Professional diploma in engineering with master's degree</p> <p>National diplomas at level 7</p>	7

	Professional certificates/titles – level 7 Professional qualification certificates – level 7 Professional qualifications on demand – level 7	
8	Doctoral degrees Professional certificates/titles – level 8 Professional qualification certificates – level 8 Professional qualifications on demand – level 8	8

The NPQF is open to both regulated and non-regulated qualifications, including private-sector and international credentials meeting RNCP and RS quality standards. Industry or sector-specific qualifications, such as Certificats de Qualification Professionnelle (CQPs), can be registered in either the RS or RNCP, enabling national validity and eligibility for personal training account funding.

State-issued qualifications are automatically integrated into the NPQF, while others require approval from the vocational and professional qualifications committee within France Compétences. To be included in the RNCP, qualifications must meet specific criteria, including occupational, competence, and assessment standards, structured into competency units, and classified by field of activity and NPQF level.

National Qualification Framework in Italy

The Italian National Qualifications Framework (Quadro Nazionale delle Qualificazioni- QNQ), structured into eight levels, encompasses qualifications from various educational and vocational domains, including general, technical, and vocational education, higher education, adult education, regional VET qualifications, and regulated professions. Currently in the activation stage, the QNQ has undergone referencing processes with the European Qualifications Framework (EQF), with an updated report presented in 2022.

Aligned closely with the EQF structure, the QNQ defines eight qualification levels characterized by descriptors covering knowledge, skills, responsibility, and autonomy dimensions. Sub-descriptors have been developed to ensure comprehensive coverage of all qualifications, extending EQF descriptors and adjusting dimensions to the national context where necessary, particularly for knowledge and responsibility and autonomy descriptors.

The QNQ levels can be further articulated into six sub-levels, providing qualitative insights into qualification pathways and specialization. It encompasses formal qualifications awarded within the National System of Certification of Competences (NSCC), including various educational and vocational streams.

Table 7. Italian qualifications framework (QNQ)¹⁹

NQF level	Italian formal qualifications	EQF level
1	Final diploma of the first cycle of education Certificate attesting the achievement of a level of knowledge of the Italian language at level A2 of the CEFR Final diploma of the first cycle of education (Adult education)	1
2	Compulsory education certificate Compulsory education certificate (IeFP) Regional vocational training qualification for professional operator Certification attesting the acquisition of basic competences corresponding to the compulsory education (Adult education) - Certification for admission to the second teaching period of second level (Adult Education)	2
3	Initial education and vocational training certificate Regional vocational training qualification for professional operator	3
4	Upper secondary education diploma Upper secondary education diploma (technical or vocational) Initial education and vocational training diploma Regional vocational training qualification for technical area Higher technical specialisation certificate Certification for admission to the third teaching period of second level (Adult education) Technical, vocational or artistic upper secondary level diploma (Adult education)	4
5	Applied technologies specialisation Diploma (two-year course) Regional vocational training qualification for technical area	5

¹⁹ Cedefop (2023). European Inventory of National Qualifications Frameworks 2022 - Italy. <https://www.cedefop.europa.eu/en/country-reports/italy-european-inventory-nqfs-2022>

6	Bachelor degree First level academic diploma Applied technologies higher specialisation diploma (three-year course) Regional higher vocational training qualification	6
7	Single-cycle Master Degree Single-cycle second level academic diploma Master Degree First level university master Second level Academic diploma First level academic specialisation diploma Higher specialisation diploma	7
8	Research doctorate Research training academic diploma Specialisation diploma Second level university master Second level Academic specialisation diploma Higher specialization diploma or Second level post degree	8

An updated referencing report, based on the 2018 QNQ inter-ministerial decree, outlines criteria and procedures for aligning NSCC qualifications at national and regional levels to the QNQ. The process, managed by ANPAL and involving an independent evaluation by the National Institute for Public Policies Analysis (INAPP), aims to level individual qualifications to the QNQ. Once completed, the QNQ register is expected to include approximately 12,000 national and regional qualifications.

Future plans include the possibility of incorporating international qualifications into the QNQ. However, qualifications from non-regulated professions currently lack national or regional frameworks for referencing to the QNQ. Micro-qualifications, introduced by a 2013 decree establishing the NSCC, are eligible for leveling to the QNQ.

National Qualification Framework in Lithuania

The Lithuanian Qualifications Framework (Lietuvos kvalifikacijų sandarac – LTQF) was officially established in 2010 and is currently operational. It comprises eight levels based on learning outcomes, encompassing all officially recognized qualifications across general education (primary and secondary), vocational education and training (VET), and higher

education. Joint referencing with the European Qualifications Framework (EQF) and the Qualifications Framework of the European Higher Education Area (QF-EHEA) was finalized in late 2011, with the referencing report published in 2012.

The LTQF serves as a regulatory framework delineating qualifications level and advocating for the validation of informal and non-formal learning. It plays a key role in facilitating the development and approval of sectoral qualification standards and study field descriptors, as well as the design and implementation of VET and higher education programs. Moreover, it aids in formulating learning outcomes for general education programs and assessing competencies acquired through formal, non-formal, and informal learning, including the recognition of foreign qualifications.

Combining an eight-level structure with descriptor principles from the EQF, the LTQF defines level descriptors based on two parameters: activity characteristics and types of competence. This allows for detailed descriptions of each level, aligning with the EQF's differentiation between knowledge, skills, and competencies (autonomy and responsibility as outlined in the 2017 EQF recommendation), and further elaborating on the characteristics of activities.

Designed as a comprehensive framework for lifelong learning, the LTQF currently encompasses qualifications from general education (primary and secondary), VET, and higher education. However, qualifications obtained outside formal education and training are not yet included.

Implementation of the LTQF revealed a gap at level 5, leading to the inclusion of two types of qualifications at this level: VET diplomas obtained through post-secondary VET programs, and short-cycle higher education programs resulting in a study certificate. To address this gap, eight modular post-secondary VET programs were introduced, along with short-cycle higher education programs in fields like tourism and leisure, and informatics engineering and program systems.

Under the law on research and higher education, study field descriptors and qualification standards serve as primary guidelines for the development of short-cycle programs, ensuring consistency with the framework.

Table 8. Lithuanian qualifications framework (LTQF)²⁰

LTQF level	Qualification type	EQF level
1	VET diploma, level 1	1
2	VET diploma, level 2	2
3	VET diploma, level 3 Lower secondary education certificate (completion of lower secondary education programme and testing learning outcomes) (grades 5-10)	3
4	VET diploma, level 4 Matura diploma (on completion of the upper secondary education programme and passing matura examinations)	4
5	VET diploma, level 5 Study certificate – short cycle HE programmes	5
6	Bachelor's diploma Professional bachelor's diploma	6
7	Master's diploma Certificate of residency	7
8	Doctoral diploma	8

The LTQF continues to evolve to meet the dynamic needs of education and training in Lithuania, ensuring the recognition and value of individuals' skills and qualifications.

National Qualification Framework in Slovenia

The 10-level Slovenian qualifications framework (Slovensko ogrodje kvalifikacij - SQF) , adopted in July 2016, is intricately linked to the European Qualifications Framework (EQF) and self-referenced against the Qualifications Framework for the European Higher Education Area (QF-EHEA) since May 2013. It offers a comprehensive coverage of educational qualifications (acquired through general, vocational/technical, and higher education), vocational qualifications, and supplementary qualifications awarded outside the regulated qualifications system. Currently, the SQF is operational.

Featuring 10 qualification levels, each level's descriptor encompasses three categories of learning outcomes: knowledge, skills, and competences. While each qualification incorporates all three categories, the weight of each may vary, allowing the SQF to encapsulate the diverse spectrum of learning outcomes and qualifications, regardless of the setting or purpose of acquisition.

²⁰ <https://www.cedefop.europa.eu/en/country-reports/lithuania-european-inventory-nqfs-2022>

The SQF comprises:

- Educational qualifications obtained upon completing formal education programs (general, vocational/technical, and higher).
- Vocational qualifications, including National Vocational Qualifications (NVQs) achieved through the validation of non-formal and informal learning (VNFIL) or certificates of completed further training programs at SQF levels 3 to 5, in compliance with technical and higher education regulations.
- Supplementary qualifications acquired through additional and supplementary training in the labor market, enhancing abilities and competences. These qualifications, focusing on labor market relevance, are awarded outside the regulated qualifications system by employers, groups of employers, or the public employment service, and can be included at levels 2 to 8.

For educational qualifications acquired through nationally accredited programs, input criteria such as access requirements, typical program length, and volume of learning activities (expressed in credit points) are considered alongside learning outcomes. NVQs define qualifications and assessment standards but not the associated programs or pathways.

Legacy awards and qualifications awarded before the Bologna reform are also incorporated into the SQF.

Applications for levelling supplementary qualifications may be submitted by employers, groups of employers, or the Employment Service. The assessment is conducted by the National Institute of the Republic of Slovenia for Vocational Education and Training (CPI), with a positive evaluation leading to levelling by the EQF National Coordination Point (NCP) expert committee. Levelling criteria include applicant suitability, relationship to existing qualifications, description of learning outcomes, program consistency and feasibility, quality assurance, and labour market relevance. Supplementary qualifications are included in the SQF for 5 years, with the possibility of extension upon application by the provider.

Table 9. Slovenian qualifications framework (SQF)²¹

NQF level	Educational qualification	Vocational qualification	Supplementary qualification	EQF level
1	Certificate of completing grades 7 or 8 of elementary education Elementary school leaving certificate			1
2	Elementary school leaving certificate (9 years)	NVQ certificate		2
3	Final examination certificate (lower vocational education, 2 years)	NVQ certificate Certificate of completed further training programme	Certificate of supplementary qualification	3
4	Final examination certificate (secondary vocational education, 3 years)	NVQ certificate Certificate of completed further training programme	Certificate of supplementary qualification	4
5	Vocational matura certificate (secondary technical education, 4 years) General matura certificate Master craftsperson's examination certificate Foreperson's examination certificate Managerial examination certificate	NVQ certificate Certificate of completed further training programme	Certificate of supplementary qualification	4
6	Short-cycle higher vocational diploma Old short-cycle higher vocational diploma	NVQ certificate Certificate of completed further training programme	Certificate of supplementary qualification	5
7	Academic bachelor's diploma Professional bachelor diploma Professional higher education diploma Specialisation diploma following old short-cycle higher education	Certificate of completed further training programme	Certificate of supplementary qualification	6

²¹ Cedefop (2023). European Inventory of National Qualifications Frameworks 2022 – Slovenia. <https://www.cedefop.europa.eu/en/country-reports/slovenia-european-inventory-nqfs-2022>

8	Master's degree Specialisation diploma following professional higher education Diploma of academic higher education Higher education diploma	Certificate of completed further training programme		7
9	Research master's degree Specialisation diploma following academic higher education			8
10	Doctoral degree			8

Harmonization of NQFs with the EQF

The table provided illustrates the correspondence between the EQF and NQFs from countries represented by the project partners.

EQF level	Spain (MECU)	France (NPQF)	Italy (QNQ)	Lithuania (LTQF)	Slovenia (SQF)
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4-5
5	5	5	5	5	6
6	6	6	6	6	7
7	7	7	7	7	8
8	8	8	8	8	9-10

In Spain, the Marco Español de Cualificaciones para el Aprendizaje Permanente (MECU) comprises eight levels, aligning closely with the EQF structure. The MECU emphasizes learning outcomes across its levels, focusing on knowledge, skills, and autonomy and responsibility. Similarly, France's National Professional Qualifications Framework (NPQF) was introduced with eight levels, referencing the EQF to ensure coherence and comparability.

The descriptors of the NPQF incorporate national specificities while aligning with the EQF's principles.

Italy's Quadro Nazionale delle Qualificazioni (QNQ) defines eight qualification levels characterized by descriptors covering knowledge, skills, responsibility, and autonomy. Sub-descriptors ensure comprehensive coverage, extending EQF descriptors and adjusting dimensions to the national context where necessary. In Lithuania, the Lithuanian Qualifications Framework (LTQF) serves as a regulatory framework delineating qualifications level, based on learning outcomes and aligned with the EQF.

Slovenia's Slovenian Qualifications Framework (SQF) consists of ten qualification levels intricately linked to the EQF, covering educational qualifications, vocational qualifications, and supplementary qualifications. Each level's descriptor encompasses knowledge, skills, and competences, ensuring comparability with the EQF.

When creating training programs, it's crucial to ensure that qualifications obtained by learners are transparent, comparable, and transferable across borders. Harmonizing NQFs with the EQF facilitates this process, allowing for the seamless recognition of qualifications acquired in different countries. By aligning learning outcomes and qualification frameworks, stakeholders in Industrial Symbiosis training benefit from enhanced mobility, recognition, and collaboration opportunities.