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SiT
Sustainability in TCLF

D3.2
TRAINING TOOLKIT

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	insights on how the SiT training programmes could be accredited and validated in the countries, based on their European contextualization.
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PROJECT SUMMARY

The SiT project involves 15 partners from 8 EU countries; the consortium is made up of organisations from VET, C-VET, HE and business representatives in order to create a bridge between education and the labour market.

The SiT project aims to foster innovation in education, training, and the TCLF sector. It focuses on the potential of green transition and developing new training modules to address skill gaps.

SO1: To identify a training structure starting from existing and emerging skills needed for the green transition of the TCLF sector, based on sustainable and circular economy principles.

SO2: To develop innovative and multidisciplinary curricula for HE and c-VET, based on learner-centred, active learning and problem- and practice-based learning, also promoting mobility opportunities for learners, on the topic of the green transition of the TCLF sector.

SO3: To promote the acquisition of TCLF functional, as well as transversal and green, knowledge, competences and skills for learners (university students/TCLF owners/workers/managers), with the final aim of providing them with proper professional competences in order to fill the gap with the labour market needs, up-skilling and re-skilling of workers/TCLF MSMEs owners and staff in order to adapt their profiles/companies to the new requirements of the labour market toward the green transition of the TCLF sector.

SO4: To promote the flow and co-creation of knowledge between higher education/research and vocational education and training, the public sector and the business sector in order to contribute to innovation in business modelling and in education and training.

SO5: To face the above-mentioned challenges, SO5 is to promote the development of a supportive ecosystem for the green transformation of the MSMEs in the TCLF sector and start-ups, in the form of an interactive platform and local hub that will be based upon the creation of local multi-actor networks including all potential stakeholders for green solutions.

SUMMARY OF THE TRAINING TOOLKIT

This Training Toolkit has been developed as part of the Erasmus+ project Sustainability in Textile (SiT; project number 101140058 — ERASMUS-EDU-2023-PI-ALL-INNO), and it is a core outcome of WP3, providing the basis for the application in the field in WP4 and WP5.

This document should be read and analysed also in light of the report "SUMMARY ON CURRICULA FEEDBACK WITH RECOMMENDATIONS", available on the project website: https://sitproject.eu/

This document is structured into four main sections:

1. **Introduction** – This section presents the overall scope of the toolkit, the target group it refers to, the objectives it aims to achieve and an overview of the characteristics of the TCLF sector that influence the training. Moreover, it introduces the National Frameworks and the European Framework, explains the main findings of the Report "Summary on curricula feedback with recommendations" and how it is lined with this tool and provides some final notes.

2. **Training Methodology** – This section, certainly the most substantial one, describes firstly the methodologies applied in the delivery of the training. We propose a brief overview of the strengths of various learning environments – online learning environments, face-to-face learning, and work-based learning (WBL) – and incorporate diverse instructional methods, including project-based learning. The section outlines the benefits of each approach and offers guidance on effective techniques for implementation. Furthermore, this chapter highlights certain elements that characterise the two profiles and that should be given particular consideration, and some training risks are highlighted, and preventive activities are suggested to avoid them.

3. **Curriculum Structure and Modules** – This section details the construction of the training pathways and the content of the modules. It also clarifies the role of trainers and the committee in the competence evaluation process, describing the methods

and tools that can be used to assess and recognize learners' acquired skills.

4. **Accreditation and Certification** – The final section offers recommendations and insights on how the training programmes refer to the European framework and gives some ideas on how they could be accredited and validated in other countries, underlining the responsibility of each user to check how the profiles and the certifications can be ensured within national qualification frameworks.

1. INTRODUCTION

1.1 SIT - Sustainability in TCLF: Training Toolkit

The Training Toolkit has the objective of providing structured and practical guidance for the implementation of the two modular curricula designed within the framework of the SIT project: the curriculum for **Recycling Manager (EQF Level 6)** and the curriculum for **Bio-Textile Technician (EQF Level 5)**.

This tool outlines the adopted training approach and methodology and the structure of the programmes and curricula and offers practical suggestions and ideas for delivering the training activities effectively. We underline the importance of a common system of evaluation and offer recommendations and insights on how the training programmes could be accredited and validated in the countries, based on their European contextualisation.

1.2 Field of work and professional profiles

The TCLF sector is undergoing a profound transformation as sustainability and circular economy principles become key drivers of its future development. Growing environmental concerns, rising consumer demand for eco-friendly products, and increasing regulatory requirements are all contributing to a shift in the skills landscape—especially with the emergence of new green job profiles.

Among the most promising professions expected to gain relevance are the **Bio-Textile Technician** and the **Recycling Manager**. These roles are central to the sector's evolution, playing a vital role in reducing environmental impact and promoting sustainable innovation.

The **Bio-Textile Technician** is a newly emerging role that addresses the demand for sustainable alternatives to traditional textile materials. These professionals specialize in the research, development, and application of bio-based and biodegradable textiles that support sustainability goals. As the use of biomaterials becomes more widespread, Bio-Textile Technicians are leading efforts to replace synthetic fibres, lower resource consumption, and improve the environmental footprint of production processes. In light of the required skills,

working methods, and techniques that this professional must master, the role is positioned at EQF level 5.

In parallel, the **Recycling Manager** is becoming increasingly important for enabling circularity within the textile supply chain. This role is responsible for designing and managing systems that facilitate efficient textile recycling, waste reduction, and resource recovery. Recycling Managers coordinate efforts across the value chain to ensure that materials are properly collected, sorted, and processed, in line with environmental regulations and circular economy principles. Their work is crucial for companies striving to adopt more sustainable and compliant practices. In light of the required skills, working methods, and techniques that this professional must master, the role is positioned at EQF level 6.

1.3 Audience of the Document

The **primary audience** of the Training Toolkit consists of trainers who will be responsible for delivering the programmes.

Trainers are selected from individuals with specific expertise in the modules included in the programme and with expertise in supporting and motivating learners, forming a teaching team coordinated by a reference figure based within the project's partner organisation in each participating country. Experts involved are chosen based on their CVs and prior experience in both training delivery and the development of educational materials. Each trainer has the autonomy to apply the teaching methods and structure the materials in ways that align with their personal teaching approach and the topics they cover. However, they are expected to adhere to the defined structure of the training. As the project includes a significant online component delivered asynchronously, trainers are also responsible for responding to questions submitted via email or arranging one-on-one meetings upon request. The role of the trainer is fundamental, and on this occasion we would like to emphasize once again that this role requires not only deep and structured knowledge of the technical and specific subject matter, but also the ability to manage a group of adult learners. Each organization, when planning its own national version of the training program, must define the activities to be carried out by the trainer and agree with them on a schedule of

attendance. It is also recommended that, even during the e-learning phase, there should be fixed meeting times during which the training “milestones” are defined.

However, we also consider this material to be valuable for all individuals involved in the project, whether as coordinators, researchers, or in other roles **(secondary audience).** A comprehensive understanding of the project’s implementation—along with the pedagogical choices and methodologies adopted—is, in our view, essential for grasping the overall structure and rationale of the intervention.

This material is also valuable for future reflections on the design of courses and training aimed at recognizing these two professional profiles within training paths inspired by or replicated from this project.

Moreover, the Toolkit may serve as a source of inspiration and practical guidance for the design of other training initiatives, even beyond the scope of this specific sector. The reflections and decisions made during the development of the methodology are transferable and may be effectively applied in other educational contexts. For this reason, we identify a last, indirect target group who may benefit from the Toolkit: professionals working in adult education and training, particularly those engaged in management innovation or in technical and vocational education and training (VET). The approaches outlined in this resource may offer useful models and ideas for enhancing training practices in these fields as well.

1.4 The National Frameworks and The European Framework

All the countries participating in this project have their own National Qualification Frameworks. However, in none of these frameworks are the two professional profiles defined by the project clearly identified so far—that is, there is no existing qualification that precisely describes the roles we are outlining with these two profiles. This is not surprising: as these are newly emerging roles, any alignment will likely happen in the future. It is therefore important to have a clear understanding of the role of the European framework.

The European Qualifications Framework (EQF) is a tool developed by the EU to make national qualifications more understandable and comparable across countries. It aims to

support mobility, lifelong learning, and professional development by using learning outcomes to describe what individuals know and can do.

EU Member States are encouraged to align their national qualifications systems with the EQF's eight levels, ensuring transparency and consistency. To do this, they must submit detailed referencing reports based on agreed criteria. Once aligned, all new qualifications should clearly indicate their corresponding EQF and national framework levels.

1.5 Report "Summary on curricula feedback with recommendations"

This document provides a comprehensive summary and set of recommendations based on the workshops conducted as part of the WP3 activity in **Bulgaria, Croatia, Estonia, Germany, Italy, and Spain** regarding the development and implementation of the two proposed curricula for Recycling Manager and BioTextile Technician professional profiles.

The main findings are as follows: there is a strong emphasis on designing flexible, modular curricula that can be adapted to various learner needs, from students to SMEs and reskilling paths. Practical learning is considered essential, with a focus on real-world experiences such as case studies, simulations, factory placements, and collaborations with recycling centres or second-hand shops. Digital and green skills are integral, including AI literacy and sustainability tools, with a focus on aligning training with legal and market expectations. Specific attention is given to the needs of SMEs, promoting efficient, low-cost transformation practices. There is also a call to embed sustainability more deeply in education—not just as a trend, but as a cultural and identity-based value—supported by awareness campaigns. Developing teachers and mentors is key, both in terms of subject knowledge and process-orientated methods, alongside the involvement of experienced practitioners. Clarifying professional roles and EQF levels is recommended, making career paths and leadership expectations more visible. Finally, greater EU-wide collaboration is encouraged through international networks and coordinated training or certification efforts linked to existing programmes such as Erasmus+.

These elements have been taken into account as much as possible in the development of the toolkit. Several individuals who contributed to the drafting of this document will, in fact, be present during the training sessions or may encourage their colleagues and employees

to take part. How can some of these suggestions be effectively implemented? Firstly, it is essential to be fully aware of the elements that have been highlighted. Secondly, selected topics may be referenced and discussed during the in-person sessions. Furthermore, should certain elements prove to be particularly relevant within our professional context, these sessions—through group work or project-based activities—may serve as valuable opportunities to explore and address them.

1.6 Recommendations and Introductory Notes

An important element, which cuts across all modules and should be taken into account both in relation to accreditation and in those concerning legislation, is the need to manage and integrate the **national and European dimensions**. Between the two, the national dimension prevails, and each teacher and trainer must take responsibility for training participants according to the relevant context. Legislative elements and their impact therefore represent key aspects to be taken into consideration, as they can significantly affect our work and the feasibility of the projects and ideas that emerge during the training.

It is therefore once again emphasized that the various organizations working at the national level play a crucial role in defining, together with the trainer, how to interpret and adapt these dimensions in their specific context. During the e-learning phase, the training was designed to provide all participants with a broad, European-level perspective and a comprehensive general understanding of the key themes. The intention was to create a shared foundation of knowledge accessible to everyone, regardless of their national context.

In the subsequent phases—through group work and interactive activities—participants will have the opportunity to bring in their own national perspectives and professional experiences, enriching the collective learning process. These activities will allow for a deeper exploration of the national dimensions of the topics addressed, fostering mutual exchange and the integration of diverse insights and practices.

Nonetheless, the European dimension should not be lost from view, even if the focus in these stages should be primarily on the local context. Trainers and organizations are reminded to make full use of the proposed materials — to integrate, adapt, and bring them to life together with their participants.

A second element of crucial importance is the distinction between the two profiles — one of a technical nature and the other of a managerial nature. In this regard as well, although part of the training targets both groups, it is the trainer's responsibility to adopt the methodologies most appropriate to each profile.

This distinction can also influence both participants' levels of engagement and their expectations. While phase 1 of the training is common to all, phases 2 and 3 provide the opportunity for deeper differentiation, even in situations where the two profiles take part in joint sessions.

It should also be noted that the languages used — including technical terminology — may differ significantly between the two profiles, and this must be carefully taken into account when designing and delivering the training.

Here again, it is essential to emphasize the importance of careful planning and joint design among the organizations responsible for national-level implementation, the trainer, and any other relevant contributors. This collaborative preparation phase is key to ensuring that the training effectively addresses the specific needs, expectations, and communication styles of both profiles.

2. Training Methodology

This section is intended to provide useful guidance to those conducting training, to best incorporate the skills of the trainer with what are the aims and characteristics of the training.

2.1 Learning, approaches and techniques applied

In light of the characteristics of the two identified professional profiles, the tools and methodologies adopted for the training programme rely heavily on techniques for teaching technical knowledge and concepts. From this perspective, the materials and concepts are presented in alignment with the requirements of Levels 5 and 6 of the qualifications

framework, ensuring appropriate depth, complexity, and relevance to the learners' expected competences and professional roles.

However, these are carefully integrated and structured to reflect the specific features of the intended target group and the context of the training: the age and background of participants and the extensive use of Digital Platforms.

2.1.1 Age and background of participants

The programme anticipates the involvement of individuals with prior professional and life experience. We can consider these two learning theories to gain further insight into the role of our professionals as trainers:

Constructivism highlights that learners actively build knowledge based on prior experience. It emphasises learner-centred approaches, real-life relevance, and social interaction—key aspects when training adults with diverse backgrounds.

Experiential Learning (Kolb) is based on learning through experience, reflection, and application. It supports practical, hands-on training and encourages continuous learning cycles, making it especially suited for adult and vocational education.

Both theories offer valuable guidance for designing meaningful, inclusive, and effective training experiences.

Trainers should adopt language, methods, and tools that are specifically suited to adult learning, with particular attention to participants' previous educational and professional backgrounds. Specifically:

a. Focus on adult learning

Training materials, teaching methods, and tools are selected based on the learning processes typical of adults. These choices take into account everyday experiences, educational backgrounds, prior knowledge, work and social environments, and spoken languages. The aim is to identify learning strategies that ensure greater accessibility and a stronger connection to the training content. This approach is grounded in the understanding

that adult learning is most effective when it relates directly to real-life contexts—an especially relevant principle in highly diverse settings.

b. Participatory approach

Training activities are designed to recognise and leverage participants' previous experiences—whether acquired formally or informally—in order to encourage exchange, cooperation, and a sense of community. This approach supports collaborative working methods and fosters the development of social and relational skills, which are also beneficial in hierarchical or role-diverse environments.

c. Use of innovative communication and interpersonal tools:

The programme incorporates modern tools and techniques to facilitate effective communication and interpersonal engagement among participants, enhancing both the learning experience and group cohesion.

2.1.2 Extensive Use of Digital Platforms

Given the structure of the course, digital tools play a fundamental role in the learning process. The approach is to integrate a variety of multimedia elements—such as videos, reading materials, images, and short explanatory articles—to support and enrich the training content. These digital resources are designed to engage participants, accommodate different learning styles, and provide flexible access to information.

2.2. Participatory methods

The project seeks to prioritize participatory methods wherever feasible. The subsequent section presents a collection of exercises designed to enhance the engagement. When planning each activity, careful consideration must be given to the group's composition as well as the individual needs and characteristics of participants. The overarching goal of the training and exercises is inclusivity, ensuring that every participant can comprehend and actively participate. For instance, physical constraints should be accommodated in movement-based activities, and readability concerns—such as challenges with cursive writing—should be addressed.

2.2.1 Group dynamics

This word refers to collective activities commonly employed in organisational settings to build rapport, foster trust, and enhance interpersonal relationships among team members. These activities are designed to promote integration and strengthen trust and must be adapted to the participants' ages and contexts. Group dynamics are typically categorized according to their intended outcomes, such as introductions, conflict resolution, relaxation, training, memorization, knowledge acquisition, reflection, and collaboration. Essential criteria for any group dynamic include a shared goal among participants, engagement as a unified group or subgroup, and mutual support toward achieving a common objective. Effective group dynamics stimulate emotional engagement, creativity, energy, or constructive tension, thereby enhancing individual skills and strengthening overall group commitment.

2.2.2 Support motivation

Motivation is a state of mind that significantly influences the processes we undertake to achieve our goals. We may approach these processes with enthusiasm and active engagement, or conversely, with discouragement that leads to abandoning our studies. Motivation plays a crucial role in goal attainment and must be supported by a positive attitude towards the journey ahead.

When beginning an educational programme or any developmental process, it is essential to have a clear understanding of the objectives we wish to achieve. Reflecting on key questions—such as which skills we want to improve or whether the training aligns with our future ambitions—can help identify the motivation needed to commence the programme.

It is equally important to maintain realistic expectations regarding the programme's outcomes, as training demands effort and commitment. At this stage, motivation and a constructive mindset are vital, as they enable us to proceed with enthusiasm toward our personal goals.

Confidence and excitement are fundamental to success. By challenging yourself, conducting thorough research, completing all coursework and assignments, and setting attainable

objectives, you increase your chances of reaching your goal. Ultimately, the accomplishment and recognition will be yours.

2.2.3 Team Building Activities

'Team building' refers to a comprehensive set of activities designed to cultivate high-performing teams and enhance interpersonal relationships within a collective. Depending on the specific objectives—such as fostering trust, integration, responsibility, cooperation, tolerance, self-awareness, honesty, emotional intelligence, work quality, negotiation skills, assertiveness, or leadership—a diverse array of methodologies and dynamics may be employed, tailored to the particular needs of the team or target group.

In the process of establishing effective work teams, a wide range of strategies can be implemented, with selection criteria based on factors including the group's composition, demographic characteristics, and the intended goals of the team.

2.3 Learning Environments and Blended Learning

The learning environment plays a crucial role in the overall effectiveness of training, whether delivered remotely or in person. The SIT project has opted for a distance learning approach, designed to be completed asynchronously, complemented by a limited number of in-person sessions.

2.3.1 E- learning - (MOOC)

E-learning has established itself as a key component of modern education and is now an essential element of contemporary training systems. Offering courses online provides numerous benefits, including the ability to reach participants in remote or rural areas. Moreover, it enhances the overall accessibility of training by overcoming geographical and time-related barriers, as learners can access materials more flexibly and conveniently (OECD & European Union, 2023).

In our case, the online format has been specifically designed also to allow participants to balance their professional and family responsibilities with their learning journey. As presented in the next paragraph, the risk of dropout is linked with the fact that e-learning is truly effective only when participants are actively engaged and demonstrate self-motivation

and a genuine willingness to learn—regardless of their physical distance from learning institutions. Several factors significantly influence the success of online learning, including the learner's level of motivation, digital literacy, communication abilities, and preferred learning style. A major challenge in e-learning often lies in the learner's limited autonomy or difficulty in managing their own learning process. This is frequently linked to their attitudes towards online education—whether they perceive the materials as relevant and valuable—and to the usability and accessibility of those materials, as well as the effectiveness of the delivery platform. For this reason, training programmes must be carefully designed to promote engagement, offer user-friendly tools, and support learners in developing independent learning strategies.

Given the expected profile of participants, we anticipate a generally advanced level of familiarity with online learning systems and platforms. Therefore, trainers involved in designing the learning environment may, if they consider it appropriate, incorporate additional tools and applications—either as supplementary exercises or as integral parts of the course content. In any case, it is recommended to provide a brief instructional guide outlining how to access and navigate the learning materials.

The reviewed literature highlights a rich and evolving body of research on MOOCs and open e-learning methodologies, reflecting a growing global interest in education models that are flexible, scalable, and accessible. Studies span multiple regions and disciplines, with notable contributions from Europe (e.g., Maiz Olazabalaga et al., 2016), Asia (e.g., Celik & Cagiltay, 2024), as well as international organisations such as UNESCO, which provide broader global frameworks.

The literature includes both theoretical explorations and empirical studies, offering valuable insights into MOOC classifications (Kesim & Altınpulluk, 2015), instructional design and pedagogical approaches (Quintana & Tan, 2019), learner engagement strategies (Wang et al., 2022), and issues related to course completion (Celik & Cagiltay, 2024).

Overall, the literature demonstrates high academic rigour, methodological diversity, and strong relevance to contemporary educational challenges. This is especially true for vocational sectors such as TCLF, where MOOCs can play a strategic role in supporting both green and digital transitions.

2.3.2 Face-to-Face Learning

The hours dedicated to face-to-face meetings can be structured in the best possible way to respond to the needs of the national, regional or local context and the participants.

This section plays an important role in structuring and differentiating the two professional profiles. As mentioned in the introductory notes, the project aims to train two distinct professional figures. A key function of this session is to develop differentiated forms of communication tailored to each profile. Specifically, the technical profile will require more detailed information on technical issues, and while it may benefit from participatory approaches, it will not rely solely on them. The managerial profile, on the other hand, is particularly well-suited to the use of cooperative and participatory techniques and tools.

Another important aspect of these sessions is the opportunity they create for collaboration and the exchange of ideas between the two profiles. In fact, some activities are designed to actively engage both profiles, encouraging dialogue and joint reflection. This interaction not only strengthens mutual understanding but also anticipates the type of collaborative work they are likely to carry out in real-world contexts.

Some possible ways of organising the face to face/blended activities include:

- Proposing the draughting of a project that involves both technicians and managers working together in the classroom, separately at home, and possibly online. This approach allows participants the space and time to develop projects that may already be in draft form or are initial ideas for which they have not yet had the time, tools, context, or guidance to fully structure.

- Allowing sufficient time for the contextualisation of laws, regulations, and directives that, at various levels, significantly influence the possibilities and working methods within the project's relevant sector.

- Using the sessions to conduct group activities aimed at locally contextualising the project and proposing simulations and case studies. For the development of these, it is also possible to invite individuals working in similar contexts, both nationally and internationally, who can share their experience.

2.3.3 Project-based learning and Work-based learning

Project-Based Learning (PBL) is an instructional methodology that places learners at the centre of the educational process, emphasising active engagement through the exploration of real-world problems and challenges. Within this framework, knowledge and skills are acquired through the development of experience and hands-on projects. Rather than relying on passive information absorption, learners participate in inquiry-based activities, collaborative tasks, and problem-solving processes, culminating in the creation of tangible outputs such as products, presentations, or formal reports. It is closely aligned with the participatory and experiential approaches promoted by the project, as it emphasises active learner involvement, real-life application of knowledge, and the development of both technical and transversal skills through direct experience and collaboration. The project's contents are defined based on the specific professional profile and agreed upon with the participants. The designated training coordinator is responsible for collecting participants' ideas and interests and assessing how these can be translated into a concrete project or activity. It is expected that most participants—across both profiles—will be either employees or self-employed professionals already active in a specific sector. For this reason, the work project content will be highly practical, rooted in real-life activities and contexts, and potentially applicable within the participants' actual working environments. The training material for the face-to-face (F2F) training in **SiT** includes PPT presentations (SiT template) enriched with practical assignments, tables, graphs, pictures, short-term projects, templates, and more, as well as interactive elements such as workshops, group work, discussions, and role-plays. Within each module, both face-to-face and self-directed activities are proposed, which participants are encouraged to use and adapt according to the context in which the training takes place.

This structure reflects the current approach adopted in the **SiT project**. However, future trainers using this toolkit may choose to organize and deliver the F2F component differently, adapting the methodology and materials to better suit their specific objectives, audience, and national context. These materials are available as Annex 1 (ANNEX 1 "Face-2-Face").

Work-Based Learning (WBL) is an educational approach that combines theoretical instruction with practical experience in real work environments. It allows learners to apply the

knowledge and skills acquired in the classroom directly in professional settings, enhancing their employability and understanding of workplace dynamics. WBL promotes collaboration between training providers and employers, ensuring that learning outcomes align with labor market needs and that participants develop both technical and soft skills relevant to their field. The training material for Work-Based Learning (WBL) includes concise project descriptions, clear instructions, relevant resources, guidelines, and templates to support the completion of assignments. PowerPoint presentations (PPTs) may also be used where appropriate. Practical assignments should be designed to be carried out directly in the workplace, and it is recommended to incorporate reflection tasks and templates for supervisor feedback to enhance learning and support continuous improvement.

We support the use of these methods also because the bibliography offers a comprehensive overview of both theoretical and practical perspectives on Work-Based Learning (WBL), underscoring its growing recognition as a distinct educational paradigm. Seminal works—such as Wenger's (2001) concept of *communities of practice*, which frames learning within informal, socially embedded group contexts, and Raelin's contributions (1997, 2008), which integrate tacit and explicit knowledge with individual and collective learning processes—lay the foundation for this approach.

Further insights are provided by Eraut (2004) and Lester & Costley (2010), who examine informal learning and curriculum development in higher education, affirming WBL's value in fostering real-world competencies. The challenges of assessment and strategies for learner-centred evaluation are addressed by Brodie & Irving (2007) and Scholtz (2020), emphasising the importance of context-sensitive methodologies.

From a policy perspective, Cedefop (2015) provides an analysis of European WBL practices within continuing vocational education, while Major (2016) explores different WBL models emerging from university-employer partnerships. Pfau (2005) adds a practical dimension with his focus on effective on-the-job training strategies.

In relation to our project, this phase is also dedicated to defining the differences between the two profiles and carrying out a series of activities, which are presented in detail in Annex 2, "Work-based learning."

2.4 Risks

The main risk we may face during the training is the drop-out due to several reasons.

- Participants experience difficulties in family conciliation to be able to follow the training.

The lack of work-life balance can be prevented by scheduling the activities and sessions in person in accordance with participants providing slots that also consider early morning and late afternoon sessions.

- A second risk is the difficulty of reconciling the required hours with one's work responsibilities.

To address this, it is recommended to periodically check with participants regarding their workload and how the training is being conducted (also considering the flexibility offered by online sessions). It is important that all participants clearly know who their main point of contact is—whether a coordinator or trainer—to turn to if needed.

- An additional risk is low motivation and unaligned expectations

If the content does not seem immediately relevant or applicable, interest may decline, and also if the training does not meet initial expectations or is too difficult, participants may become discouraged. To address this, it is again helpful to have a contact person for discussion and to provide a clear initial description of the content for each module and session.

- Technical difficulties and insufficient support

Especially during the online sessions, problems with technology or lack of digital skills can be an obstacle. Additionally, the absence of a tutor or a clear point of contact can make participants feel isolated. To address this, it is recommended to provide access to a digital and IT tutor during scheduled hours, alongside the already mentioned main point of contact.

2.5 Role and Responsibilities of the Trainer

The trainer plays a key role in supporting participants throughout the entire training program. Their main responsibility is to provide both academic and motivational guidance, ensuring that each participant is effectively accompanied along the learning path. The trainer is expected to pay particular attention to the different characteristics, experiences, and specific needs of each participant, as the training groups may often be highly heterogeneous in terms of background, professional profile, and learning pace.

In this context, the trainer is responsible for planning and facilitating both individual and group support sessions. Individual tutoring moments will be especially important during the e-learning phase, where personalized assistance can help participants engage more effectively with the materials and learning objectives. Group sessions, on the other hand, should be organized to foster collaboration, peer learning, and collective discussion, while also taking into account the participants' availability and scheduling constraints. The trainer is encouraged to adopt a flexible and adaptive approach in managing these activities.

The trainer will also be required to maintain a systematic record of all tutoring activities, including a detailed report on the hours dedicated to each phase and a summary of the main interventions carried out. This documentation serves several essential purposes: it allows for continuous monitoring of the progress of both the group and individual participants, provides valuable insights for the overall evaluation of the training process, and contributes to the continuous improvement and future development of the training program.

The information collected and reported by the trainer is therefore considered crucial for assessing the effectiveness of the learning activities and for refining the program's structure and delivery methods.

Although the trainer is not directly involved in the formal assessment of participants' learning outcomes, they are expected to design and provide exercises, examples, and practical activities aimed at helping participants successfully prepare for and complete the various evaluation stages. This pedagogical support is an integral part of ensuring that learning objectives are fully achieved.

Furthermore, the trainer must promptly report any issues, difficulties, or critical situations that may arise during the implementation of the training activities to the National Project Coordinator. Regular alignment and coordination meetings with the project team are also foreseen, particularly during transitions between different phases of the program, to ensure coherence, consistency, and effective communication across all actors involved.

2.6 Participants

In each national context, the composition of the participant group may vary according to the characteristics and structure of the respective sectoral labour markets. While VET providers are expected to involve around 20 learners per country and higher education institutions approximately 25 students, the actual profiles of participants may differ significantly from one country to another.

It is anticipated that the groups may be quite heterogeneous, including both younger participants, starting from the minimum age of 16 years (in countries where VET systems allow for this), and individuals with substantial professional experience in the field, who may have previously followed different educational pathways. This diversity is regarded as a valuable asset, as it allows for the exchange of varied perspectives and practical insights.

The national coordinating body responsible for the implementation of the initiative will be tasked with providing preliminary information on the composition of the participant group once all registration forms have been collected and reviewed.

3. TRAINING MATERIAL

In this section, we will provide an overview of the training structure and summarize the contents planned for each module. We will also outline the main tools required to successfully complete the modules, including materials, websites, and any additional resources. While no explicit reference will be made to specific accessibility tools, it is important to note that each country must comply with European and national regulations on document accessibility, and the project is committed to adopting all necessary measures to ensure that the content of each module is usable by all participants. Additional support measures (for example, the use of a screen reader) will be made available if needed. To

support trainers throughout the different phases of the project, a series of dedicated documents has been developed. These materials are designed to guide trainers in the delivery of the course, offering step-by-step instructions, methodological recommendations, and examples of best practices. They ensure consistency in the implementation of training activities and help trainers adapt the content to their specific contexts while maintaining the overall objectives and quality standards of the programme.

The first document is a summary sheet, which includes the main information such as title, duration, objectives, learning outcomes, and assessment methods. The second is a document containing the eLearning materials (Phase 1), where the content to be presented in each unit is specified, along with additional websites and references for training, as well as tests for learning assessment. The third document consists of the *Instructions for Blended training, including Face2Face training and Project-based learning and Work-Based Learning Material (Phase 2 and 3)*, which provide guidance on the activities to be carried out during these sessions. In addition, a document titled Work-Based Learning: Practical Tasks and Reflection Activities is provided, offering guidance on hands-on exercises and opportunities for self-reflection.

The two profiles correspond to distinct EQF levels; accordingly, the activities should be structured to reflect this differentiation, highlighting the more technical orientation of one profile and the more managerial focus of the other. These distinctions are particularly pronounced within the blended learning component, where the trainer possesses greater discretion to design and implement activities that address these specific emphases.

3.1 The Training Structure

The training programme is divided into three components:

- Phase 1 - E learning, which is completed asynchronously by participants - MOOC
- Phase 2- Blended training, including Face2Face training and Project-based learning
- Phase 3 - Work-Based Learning (WBL).

Duration and division of credits per phases

Phase	Training Types	Duration	ECTS
1	E-learning (MOOC)	40 - 60 hours	2 ECTS
2	Face to Face learning + Project based learning	30-40 hours	2 ECTS
3	Work-based learning	2 months / 130 hours	5 ECTS

Access to the content of Phase 1 is provided through a dedicated e-learning platform (https://platform.sitproject.eu/), which also enables verification of participants' identities. The materials are available exclusively to registered users on the device most convenient for each participant.

Each participant receives a brief introductory tutorial on how to use the platform. The modules are designed to be studied either sequentially or independently; however, participants are supported and encouraged to follow the full pathway in the order proposed by the training coordinator. Each participant receives information about the expected duration for completing each module, in order to better plan and organize their work.

There are no strict deadlines for completing the modules, although the use of a shared calendar is strongly encouraged to help participants stay aligned and committed throughout the training.

As previously highlighted, one of the main risks of this type of training is that participants may struggle to keep up, which increases the likelihood of disengagement or drop-out. For this reason, each training coordinator may suggest a calendar based on the estimated workload of each module.

This schedule should take into account that participants are workers, HE and VET students and may be involved in other concurrent activities. Where possible, it is also recommended that an initial interview be conducted with each participant to jointly develop a personalised study plan. However, the feasibility of this approach should be evaluated by each organisation.

3.2 MOOC - modules and units

● Asynchronous online individual learning

For each of the two professional profiles, eight modules have been developed. The contents of these modules are detailed in the following tables. Additionally, an extra module on sustainability has been included. This module introduces the fundamental principles of sustainability in the textile and fashion sectors, focusing on sustainable economic practices, resource management, and innovative business models such as the circular economy and slow fashion. It also explores eco-design, Life-Cycle Assessment (LCA), eco-certification, and eco-labels, offering learners both theoretical and practical insights into how sustainability can be integrated into real industrial contexts.

Case studies, quizzes, and interactive materials support the application of these concepts in practice. Expert opinions and contributions were sought across various subject areas to support the development of the modules. One of the main challenges for each trainer is to align the content with national perspectives and realities. It is essential that the modules remain relevant and applicable within the real and local context. The sequence of the modules follows a logical structure that should be respected; however, each individual may adapt the modules to fit their specific work environment and prior experience.

For each module, and e-learning document is provided. In this section of the toolkit, we thought it would be useful to include a brief summary of what is covered in each module, so that every teacher is aware of what participants have done/will do. We have also listed the recommended tools for the project work, work-based learning and face-to-face parts. The aim is to provide a comprehensive overview that will enable you to choose how best to engage with your students in these three phases.

The e-learning material is structured in a modular format, divided into thematic units. Each module typically includes between three and six units. Each unit follows a consistent and pedagogically coherent structure designed to facilitate comprehension and to explain the technical content of the module. It begins with an "Introduction", outlining the objectives and main themes of the unit, followed by a "Theory" section that presents the core concepts and key ideas. The "In a nutshell" section summarises essential definitions and takeaways, while the "Focus" section highlights key points, common mistakes, and practical advice. Each unit

also includes interactive elements such as "Check this out!" (videos, articles, and case studies), "Did you know?" (facts or curiosities), "Recommendation", "Extra reading", and a "Short quiz" to assess competences. The final quizzes represent the testing activities conducted as part of the competence assessment process, which will be described in detail in another section of this toolkit.

3.2.1 Curriculum structure for a Bio-Textile Technician (EQF5)

No. of Module	Bio-Textile Technician (EQF 5, 6)	Skills required to meet the competencies needed according to ESCO model:
M1	**Bio-based textile material properties and processing techniques** **(EQF 5)**	▪ Ability to develop and optimize bio-based materials for specific textile applications (e.g., technical textiles for performance, fashion textiles, etc.) ▪ Understanding of policies related to bio-based materials, including the EU's regulations on renewable resources and biodegradable materials
M2	**Chemistry for textile processing and dyeing with less environmental impact** **(EQF 5,6)**	▪ Knowledge of green chemistry principles and the ability to select eco-friendly chemical alternatives for textile treatment and finishing ▪ Proficiency in natural dyeing processes and the use of plant-based or microbial dyes for sustainable textile coloring
M3	**Sustainable Production of Textile/ Clothing products** **(EQF 5, 6)**	▪ Expertise in reducing water and energy consumption during textile production processes ▪ Awareness of global developments in sustainable fashion, including slow fashion, circular fashion, and the zero-waste movement ▪ Knowledge of global best practices in circular economy models specific to textiles
M4	**Sustainable sourcing and supply chain for bio-based textile materials** **(EQF 5, 6)**	▪ Capability to implement closed-loop recycling systems, where waste materials are reused within the production cycle ▪ Familiarity with blockchain technology for ensuring supply chain transparency and material traceability
M5	**Basic principles of biotechnology and bioengineering for bio-based textile materials**	▪ Familiarity with the latest advancements in bio-fabrication, including the use of microorganisms in material production ▪ Skills in integrating nanotechnology with bio-textiles for enhanced properties like strength, flexibility, or water resistance

	(EQF 5, 6)	
M6	**Quality Control and testing methods for bio-based textile products** **(EQF 5, 6)**	▪ Expertise in managing quality across different stages of production to ensure consistent performance in bio-textiles ▪ Skills in advanced testing methods for biodegradability and compostability of bio-textiles ▪ Familiarity with international environmental certifications and their application in bio-textile production
M7	**Digitalization in fashion eco-system through digital design, simulation and visualization in fashion industry** **(EQF 5, 6)**	▪ Skills in designing products for disassembly, ensuring that textiles can be efficiently deconstructed and repurposed at the end of their life ▪ Proficiency in using industry-specific software for material simulations and digital textile printing.
M8	**Adaptability, communication skills and creative thinking in fashion industry** **(EQF 5)**	▪ Knowledge of sustainable development goals (SDGs) and how the textile industry contributes to these global objectives ▪ Understanding of consumer trends toward sustainable products and the role of marketing and branding in promoting bio-textile products ▪ Expertise in incorporating innovative design methods that align with bio-textile material properties while also ensuring aesthetic appeal ▪ Ability to integrate new bio-based materials and processing technologies into existing production systems.

Module 1

This eLearning module is divided into three units focused on sustainability in the textile industry and the shift toward bio-based materials.

Unit 1 explores the impact of fast fashion (overproduction, waste, high water and energy use) and the barriers to textile recycling (technical, economic, legal, infrastructural). It introduces sustainable alternatives such as organic fibres, waste-based materials, algae, fungi, and biopolymers, with films, podcasts, and a quiz for learners.

Unit 2 presents plant-, animal-, and cellulose-based fibres (cotton, hemp, linen, wool, silk, viscose, lyocell), highlighting their benefits (lower CO_2 footprint, biodegradability, reduced chemicals) and limitations (water use, land competition, scalability). It recommends certifications, durable design, and sustainable processes.

Unit 3 focuses on innovative and waste-based textiles from food and agricultural residues (pineapple, coffee grounds, orange, apple, corn, wine by-products), as well as algae-, fungi-, and biotech-derived materials (PLA, Kombucha leather, Spider Silk). Opportunities include waste reduction and branding; challenges include costs, limited availability, and consumer acceptance.

Overall, the module provides theory, practical examples, multimedia resources, and self-assessment tools to support learning about sustainable and bio-based textile innovations.

Module 2

This eLearning module is divided into five units that address how green chemistry can make textile wet processing and dyeing more sustainable.

Unit 1 introduces the environmental challenges of conventional wet processing, highlighting its high water, energy, and chemical use, and presents approaches such as Cleaner Production and Life Cycle Thinking.

Unit 2 explains the twelve principles of green chemistry, showing how hazardous substances can be replaced with safer, biodegradable alternatives, with case studies on enzymatic scouring, low-temperature bleaching, and water reuse.

Unit 3 compares natural and synthetic dyes, discussing their advantages and drawbacks, and introduces sustainable dyeing methods such as salt-free reactive dyeing, enzymatic fibre modification, and closed-loop systems.

Unit 4 explores innovative low-impact technologies including foam dyeing, supercritical CO_2 dyeing, and plasma or ozone pre-treatments, which significantly reduce resource use though still face scalability and cost challenges.

Unit 5 focuses on pigments and digital printing as water-saving solutions, presenting their role in reducing effluents, enabling on-demand production, and supporting eco-friendly binders and low-energy curing methods.

Module 3

The module explains sustainable textile production, focusing on renewable plant and animal fibers (cotton, flax, hemp, wool, silk) and innovative biotechnological fibers (bacterial cellulose, PLA, Mylo™, Piñatex®). These alternatives to synthetic fibers are biodegradable, eco-friendly, and support a circular economy by reducing waste and pollution. Fabric production methods (weaving, knitting, non-woven) affect durability and applications, from clothing to medical textiles. However, sustainability depends on the whole process, since some fibers (e.g., cotton, viscose) still require high water or chemical use. The text encourages eco-certification, recycling, and responsible consumption as key to achieving true sustainability in fashion.

Unit 1 covers renewable natural fibers such as cotton, flax, hemp, wool, and silk. They are biodegradable, eco-friendly, and essential for reducing pollution, but their environmental impact varies (e.g., high water use in cotton).

Unit 2 explains innovative fibers made by fermentation, genetic engineering, or biopolymers, such as bacterial cellulose, PLA, Mylo™, Piñatex®, and AppleSkin®. They replace synthetics, reduce waste, and open new sustainable markets.

Unit 3 describes how fabrics are made (weaving, knitting, nonwoven). Properties like strength, elasticity, and comfort depend on the method. Focus on eco-friendly applications in clothing, medical, and technical textiles.

Module 4

Unit 1 introduces bio-textile procurement markets, focusing on sourcing decisions, supplier authenticity, and sustainability assessment. It distinguishes between traditional natural fibers (75% share), regenerated fibers (24%), and innovative materials like mycelium (<1%). Students learn to evaluate environmental, social, and economic factors, while also addressing challenges such as greenwashing, certification, and supply security.

Unit 2 explores international transport logistics for sustainable materials. It emphasizes multi-modal transport optimization, Total Cost of Ownership, cold chain logistics, and digital

tools like IoT and blockchain for traceability. Special attention is given to reducing carbon emissions, ensuring compliance, and protecting material integrity during shipment.

Unit 3 covers quality management, compliance, and continuous optimization in bio-textile supply chains. It applies frameworks like PDCA and Kaizen, introduces the Three-Tier Verification model (digital validation, lab testing, audits), and stresses predictive analytics and stakeholder transparency. The focus is on preventing compliance drift, maintaining certification integrity, and building resilient, trustworthy supply chains.

Module 5

Unit 1 introduces biotechnology and bioengineering in textiles, explaining how enzymes, microbes, and biomaterials replace polluting processes. They reduce water, energy, and chemical use, making fabrics more eco-friendly and biodegradable.

Unit 2 covers biofabrication using microorganisms such as bacteria, fungi, and algae to produce fibers, dyes, and leather alternatives. Processes like fermentation, cell culture, and bioprinting create materials such as mycelium leather and bacterial cellulose, supporting circular, low-impact production.

Unit 3 focuses on nanotechnology in bio-based textiles. Nanomaterials like silver, titanium dioxide, and cellulose nanocrystals add functions such as UV protection, antibacterial activity, and conductivity, improving durability and performance while raising safety and sustainability considerations.

Module 6

Unit 1 introduces quality control and assurance in bio-based textiles, highlighting prevention, standardisation, and continuous improvement as key principles. It stresses compliance with sustainability standards (e.g. GOTS, EU Ecolabel, OEKO-TEX), product safety, and traceability to ensure eco-friendly and reliable textile production.

Unit 2 explains quality control across the production chain, from raw material inspection to final product testing. Eight checkpoints—covering spinning, weaving, dyeing, finishing, assembly, and packaging—ensure consistency, safety, and compliance with regulations like

REACH. Technologies such as IoT sensors and automated inspections improve precision, traceability, and reduce waste.

Unit 3 covers environmental standards and certifications relevant to bio-based textiles. Labels like GOTS, OEKO-TEX, EU Ecolabel, and USDA Biobased guarantee chemical safety, organic content, reduced environmental impact, and traceability. Certification processes involve audits, documentation, and regular compliance checks, supporting credibility and consumer trust.

Unit 4 focuses on laboratory testing of bio-based textiles. Proper sample preparation and conditioning ensure reliable results. Standardised tests assess strength, abrasion resistance, colour fastness, chemical safety, and other properties. Testing protects consumer health, verifies sustainability claims, and enhances product durability and market value.

Unit 5 addresses special laboratory tests for biopolymers, particularly biodegradability and compostability in soil, compost, and aquatic environments. Standards like ISO 14855, EN 13432, ASTM D6400, and ISO 17088 guide assessments. Challenges include cost, lack of uniform standards, and limited waste management infrastructure. Compostability and ecotoxicity tests ensure materials degrade safely, supporting circular economy goals.

Module 7

Unit 1 introduces the fundamentals of digital fashion design, covering concept development, digital sketching, CAD, and PLM integration. These tools reduce waste, speed up design, and enhance collaboration while supporting sustainability through virtual prototypes and digital material libraries.

Unit 2 focuses on 3D garment simulation and virtual sampling. Designers can import digital patterns, use customizable avatars, simulate realistic fabric physics, and apply texture mapping. This reduces physical prototypes by up to 70%, lowers costs, and enables inclusive, sustainable, and creative design processes.

Unit 3 covers digital visualisation and photorealistic rendering. Techniques like Physically-Based Rendering (PBR), GPU-accelerated simulations, and AR/VR integration

allow lifelike garment previews, immersive showrooms, and virtual try-ons. These tools cut physical sampling, accelerate time-to-market, and improve consumer engagement.

Unit 4 explores digital patternmaking, grading, and CAD-to-manufacture workflows. Advanced algorithms, 3D body scanning, and automated nesting reduce fabric waste by ~30% and improve precision. Direct CAD-to-factory integration speeds production, lowers errors, and supports sustainable manufacturing.

Unit 5 addresses data-driven design and circular economy integration. Using AI-based trend forecasting, PLM with LCA modules, Higg Index tools, and digital product passports, designers can align production with real demand, reduce overproduction, and ensure traceability for recycling and compliance with EU sustainability policies.

Module 8

Unit 1 introduces sustainability challenges in the TCLF sector, focusing on overproduction, waste, pollution, and labour issues. It highlights EU policies like the European Green Deal and Circular Economy Action Plan, which push companies towards greener, transparent, and socially responsible practices.

Unit 2 explains circular economy principles and business models such as reuse, repair, remanufacturing, and recycling. Examples from TCLF brands show how product life extension, closed-loop systems, and material innovation reduce environmental impact and create added value.

Unit 3 covers eco-design strategies, including material efficiency, modularity, durability, and disassembly. Digital tools such as LCA (Life Cycle Assessment) and eco-design software support decision-making. Case studies illustrate how eco-design improves product sustainability and compliance with EU regulations.

Unit 4 focuses on sustainable supply chain management. It explores traceability, transparency, social compliance, and certifications (e.g., GOTS, Fair Trade, OEKO-TEX). Digital solutions such as blockchain and digital product passports enhance monitoring and trust across global supply networks.

Unit 5 addresses consumer awareness and sustainable consumption. It examines the rise of second-hand markets, rental models, and repair services, as well as the role of eco-labels and digital platforms in guiding consumer choices. Educating consumers fosters responsible behaviour and supports a cultural shift toward sustainability.

Specific Tools Required:

Within each module, trainers will find concrete activity guidelines, including step-by-step instructions to successfully implement the proposed ideas. These activities are designed following a participatory approach, which is at the core of the project's methodology, encouraging engagement, collaboration, and hands-on learning.

To carry out the activities effectively, the following tools are required: Specific Tools Required

The training requires a set of specific tools to ensure an engaging and interactive learning experience. Screen and audio equipment are recommended for watching films and listening activities, while internet access is essential for exploring suggested online resources. For face-to-face sessions, general teaching materials include PPT slides in the SiT design, worksheets, posters or infographics, as well as printed flashcards with key terms and closed-loop confusion cards. Whiteboards or large A3 paper with coloured pens support group work and visual exercises. Role cards, presented as short one-page briefs with defined goals and limits, help structure role-play activities, while a timer is useful for keeping the pace of tasks. Finally, a flipchart can be used to capture and summarise key takeaways, and an A3 Closed Loop Canvas template—customisable for learners—provides a structured framework for applying circular economy concepts in practice.

3.2.2 Curriculum structure for a Textile Recycling Manager (EQF6)

No. of Module	Textile Recycling Manager (EQF 6)	Skills required to meet the competencies needed according to ESCO model:
M1	**Sustainability and Circular Economy in Textile/Fashion Industry – an Overview** **(EQF 6)**	▪ Knowledge of sustainability concept and circular economy models, including product lifecycle management, EU Green Deal, Circular Economy Action Plan, the Eco-Design Directive. ▪ Implement sustainable recycling practices that align with circular economy principles
M2	**Management of Recycling Process Regulatory Compliance** **(EQF 6,7)**	▪ Organize and coordinate textile waste recycling, from collection through processing to final redistribution ▪ Understanding of the waste hierarchy (reduce, reuse, recycle) and how it applies to textiles ▪ Ensure operations meet local, national, and international waste management regulations
M3	**Closed-loop concept in Textile/Fashion Production** **(EQF 6,7)**	▪ Awareness of sustainable textile production practices, focusing on reducing water and energy usage and minimizing chemical inputs ▪ Understand the properties and lifecycle of textile materials to optimize their recovery, reuse, and recycling ▪ Apply knowledge of natural and synthetic fibers in recycling processes
M4	**Textile Recycling Technologies and Supply Chain Management** **(EQF 6)**	▪ Familiarity with textile recycling technologies such as mechanical and chemical recycling, fiber regeneration ▪ Skills in managing logistics for textile waste collection, sorting, and redistribution, ensuring efficiency throughout the recycling process ▪ Collaborate with suppliers, manufacturers, and stakeholders to enhance the recycling supply chain ▪ Develop and implement innovative approaches to improve textile recycling methods, including exploring new materials and techniques for better recovery
M5	**Environmental Regulations and Chemical Safety Standards in Textile Processes** **(EQF 6)**	▪ Awareness of sustainable textile production practices, focusing on reducing water and energy usage and minimizing chemical inputs ▪ Knowledge of different textile certifications, standards, regulations and directives

M6	**Environmental Impact and Carbon Footprint of the Textile industry** **(EQF 6,7)**	▪ Familiarity with the environmental impacts of textile production and recycling, including life cycle assessments (LCA) ▪ Ability to evaluate and minimize the carbon footprint and energy use in recycling operations
M7	**Critical Thinking and Problem-solving in Fashion Industry** **(EQF 6,7)**	▪ Identify challenges in recycling operations, analyze root causes, and develop innovative solutions to overcome them ▪ Apply critical thinking to optimize resource use, improve recycling efficiency, and address unforeseen issues in the supply chain ▪ Stay open to learning and integrating new practices that can enhance recycling processes and sustainability outcomes
M8	**Leadership and Management in Textile/ Fashion Industry** **(EQF 6,7)**	▪ Lead teams effectively to foster a collaborative environment and ensure productivity in recycling operations ▪ Motivate and guide staff to embrace sustainability initiatives and continuously improve recycling processes ▪ Foster a culture of continuous improvement within the recycling team

Module 1

Unit 1 introduces sustainability in fashion, focusing on reducing environmental impact and promoting social responsibility. Sustainable fashion emphasizes eco-friendly materials, ethical labor practices, and circular design, encouraging reuse, repair, and recycling. In contrast, fast fashion relies on cheap, low-quality clothing, overproduction, synthetic fabrics, and short product lifespans, promoting overconsumption and environmental harm.

The TCLF value chain is global and uneven, with production concentrated in developing countries and retail in developed countries. Textile production is the main environmental hotspot, while end-of-life impacts are smaller but can be mitigated with circular strategies. Brands like Patagonia, Levi's, and H&M implement sustainable initiatives, and certifications such as GOTS and OEKO-TEX ensure ethical standards. Achieving sustainability requires collaboration across the industry and consumer engagement.

Unit 2 focuses on sustainable materials and textile innovations. Natural fibers like cotton, linen, hemp, wool, silk, and alpaca are renewable, biodegradable, and environmentally

friendly, while recycled fibers reduce reliance on virgin materials. Emerging bio-based fibers, upcycling, and circular design extend textile lifespans.

Modern production techniques, such as digital printing, supercritical CO_2 dyeing, and closed-loop water systems, reduce water, energy, and chemical use. Despite progress, clothing recycling remains low, and synthetic fibers contribute to microplastic pollution. Brands like Stella McCartney and Patagonia exemplify sustainable sourcing and social engagement, supported by certifications like GOTS and OEKO-TEX. Lifecycle-focused sustainability—from fiber to end-of-life—aims to reduce environmental harm and promote a circular, ethical fashion industry.

Module 2

Unit 1 introduces sustainability in fashion, highlighting the need to reduce environmental impact and promote social responsibility. Sustainable fashion focuses on eco-friendly materials, ethical labor practices, and circular design, encouraging reuse, repair, and recycling. Fast fashion contrasts sharply, producing cheap, low-quality clothing, relying on synthetic fabrics, promoting overconsumption, and generating waste.

The TCLF value chain is global and uneven, with production mainly in developing countries and retail in developed ones. Textile production is the main environmental hotspot, while end-of-life impacts are smaller but can be mitigated through circular strategies. Brands like Patagonia, Levi's, and H&M implement sustainable initiatives, and certifications such as GOTS and OEKO-TEX ensure ethical standards. Achieving sustainability requires collaboration across brands, consumers, and policymakers.

Unit 2 focuses on sustainable materials and textile innovations. Natural fibers such as organic cotton, linen, hemp, wool, silk, and alpaca are renewable and biodegradable. Recycled fibers reduce reliance on virgin materials, and emerging bio-based fibers offer new sustainable options. Upcycling, circular design, and modern production techniques like digital printing, supercritical CO_2 dyeing, and closed-loop water systems reduce resource use and pollution.

Despite progress, recycling rates remain low, and synthetic fibers contribute to microplastic pollution. Brands like Stella McCartney and Patagonia exemplify ethical sourcing and social engagement. Lifecycle-focused sustainability—from fiber production to end-of-life strategies such as repair, resale, and recycling—supports a circular, environmentally conscious, and ethical fashion industry.

Module 3

Unit 1 is about the closed-loop concept, which replaces the linear “take–make–waste” model with systems that keep textiles in circulation through reuse, repair, and recycling. It explains biological cycles for natural fibres and technical cycles for synthetics, along with key enablers such as mono-materials, design for disassembly, and extended producer responsibility. Challenges remain with fibre blends, chemical treatments, limited infrastructure, and low consumer participation.

Unit 2 is about the role of design, which determines most of a garment’s environmental impact. Design choices are crucial: using mono-materials, avoiding blends and harmful additives, creating garments that can be disassembled, and providing clear information through labels or digital product passports. Circular design also means enabling repairability, modularity, and adaptability to extend product lifespans.

Unit 3 is about the technologies and processes that make closed-loop systems possible. Mechanical recycling is common but weakens fibres, while chemical and enzymatic methods can regenerate high-quality materials but remain costly and not widely scaled. Sorting, cleaning, and pre-processing are essential, yet fibre blends, elastane, and chemical coatings create major obstacles. Infrastructure is often lacking, though innovations such as AI-based sorting, microbial processes, and fibre regeneration show promise for the future.

Unit 4 is about business models, policies, and consumer behaviour, which are essential to closing the loop. Approaches such as resale, repair, rental, take-back, and product-as-a-service can extend garment life, but they require infrastructure and incentives. EU regulations such as the Textile Strategy, ESPR, EPR, and the Green Claims Directive push the industry towards durability, recyclability, and transparency. Still, consumer trust,

convenience, and engagement remain critical, while barriers like greenwashing and fragmented responsibility call for collaboration, standardisation, and digital tools to succeed.

Module 4

Unit 1 introduces frontier technologies and innovation management, explaining how textile recycling is evolving beyond traditional mechanical and chemical methods toward advanced enzymatic, solvent-based, and hydrothermal processes. It presents Techno-Economic Assessment (TEA) and Life Cycle Assessment (LCA) as key tools for evaluating technological, economic, and environmental feasibility, and encourages innovation through piloting, collaboration, and strategic adoption of new solutions.

Unit 2 focuses on sustainable supply chain management and transparency, describing how to design and operate circular textile supply chains that include effective reverse logistics, collection systems, and sorting facilities. The unit highlights the role of transparency tools such as Digital Product Passports, blockchain, and tracers, and stresses the need to combine human expertise with automation to improve material quality and efficiency.

Unit 3 examines the role of the Recycling Manager as a systems orchestrator, emphasizing stakeholder engagement and collaboration across brands, consumers, municipalities, recyclers, and NGOs. It explores strategies to align incentives, build partnerships, and apply policy frameworks like Extended Producer Responsibility (EPR) to create efficient, traceable, and sustainable recycling ecosystems.

Module 5

Unit 1 introduces biotechnology and bioengineering in textiles. Biotechnology relies on living organisms to create products, while bioengineering applies engineering to optimize and scale these processes. In textiles, they enable microbial dyeing, enzyme treatments, biodegradable fibres, and wastewater purification. These methods reduce pollution, limit chemical use, save energy, and support a circular economy. Important concepts include enzymes, microorganisms, and biomaterials.

Unit 2 explores biofabrication and the role of microorganisms. Biofabrication means producing textile materials through biological growth. Bacteria can generate cellulose fibres,

fungi are used to make mycelium leather, and algae provide pigments and biopolymers. Techniques such as fermentation, cell culture, and bioprinting replicate or enhance natural systems. This approach delivers renewable, biodegradable, and eco-friendly alternatives like bio-leather, bacterial cellulose fabrics, and algae-based dyes.

Unit 3 focuses on nanotechnology applied to bio-based textiles. Nanotechnology works at the nanoscale (1–100 nanometers) to give fibres advanced properties. It provides textiles with water repellency, UV protection, antibacterial activity, and smart responsiveness. Silver nanoparticles, titanium dioxide, zinc oxide, carbon nanotubes, and cellulose nanocrystals are among the most used materials. These innovations improve durability and reduce chemicals, although safety, environmental risks, and high costs remain challenges.

Module 6

Unit 1 introduces the major environmental impacts of the textile industry, which is among the most polluting sectors worldwide. It highlights high greenhouse gas emissions, intensive water and energy use, chemical pollution, and the enormous amount of waste, with up to 85 percent of textiles ending up in landfills or incineration. European policies such as the EU Strategy for Sustainable and Circular Textiles aim to address these issues by encouraging recycling, durability, and circular design. Measuring the carbon footprint across the whole life cycle of products helps identify the main sources of emissions and opportunities for reduction.

Unit 2 examines textile materials and their impacts. Cotton is resource-intensive, especially in terms of water and pesticides, while synthetics like polyester, nylon, and acrylic rely on fossil fuels and cause microplastic pollution. Bio-based materials, though still emerging, offer renewable alternatives, but their sustainability depends on sourcing and processing. The unit stresses that design choices strongly affect recyclability and environmental performance.

Unit 3 explains Life Cycle Assessment (LCA), a tool for evaluating the environmental footprint of textiles from raw material extraction to disposal. It reveals hotspots such as water use in cotton, emissions from polyester, and heavy pollution from dyeing and finishing. Even the use phase can account for a quarter of emissions. LCA guides companies and recycling managers to design for recyclability, reduce impacts, and adopt more sustainable practices.

Unit 4 focuses on sustainable solutions and innovations. It calls for moving beyond fast fashion by extending clothing life through reuse, repair, and rental, eliminating harmful chemicals, and improving recycling with advanced technologies. Using renewable inputs, transparent reporting, and innovative fibres and recycling systems are presented as essential steps towards a circular and sustainable textile economy.

Module 7

Unit 1 outlines the environmental footprint of the industry, showing how textile consumption in Europe and globally drives climate and resource pressures. It stresses that measuring the carbon footprint across the life cycle of products is essential for identifying where emissions can be reduced.

Unit 2 examines materials and their environmental impacts. Cotton requires huge amounts of water and pesticides, while synthetics like polyester and nylon are fossil-fuel based and contribute to microplastic pollution. In contrast, bio-based and renewable materials present promising but still developing alternatives.

Unit 3 introduces Life Cycle Assessment (LCA) as a tool for evaluating impacts from raw material extraction to disposal. It identifies “hotspots” such as cotton farming, polyester production, and dyeing and finishing processes, while also highlighting consumer use and end-of-life phases as critical. LCA helps companies and recycling managers reduce impacts through smarter design and circular practices.

Unit 4 focuses on sustainable solutions and innovations. These include phasing out hazardous chemicals, extending garment life through reuse, repair and rental models, and investing in advanced recycling systems. Greater use of renewable inputs, efficient resource management, and innovative business models are presented as essential for a transition to a circular and low-impact industry.

Module 8

Unit 1 explains the difference between leadership—about vision, inspiration, and change—and management, which focuses on organising, planning, and controlling processes. Both are essential: leaders drive transformation while managers ensure

efficiency and compliance. The unit also highlights leadership styles such as transformational, participative, and ethical, all highly relevant to the green transition.

Unit 2 shifts focus to leading teams. It stresses that sustainability requires collaboration, dialogue, and behavioural change, as no department can achieve circularity alone. Effective leaders foster trust, empathy, and inclusive communication, motivating teams to take ownership of sustainability goals. By modelling sustainable behaviour and celebrating small wins, they create engagement and innovation across the value chain.

Unit 3 presents strategic thinking and continuous improvement as key for adapting to circular business models. Leaders must set clear sustainability targets, monitor performance through relevant KPIs, and build systems that encourage learning and innovation. Strategic thinking helps managers balance environmental, social, and economic priorities, preparing teams for long-term resilience and adaptation to change.

Unit 4 addresses responsible and ethical leadership. Ethical leaders integrate transparency, fairness, and accountability into decisions, considering the well-being of workers, communities, and future generations. Diversity, equity, and inclusion are central to stronger, fairer workplaces, while sustainability must be embedded as a guiding mindset. Responsible leadership is not only about policies but also everyday practices that build trust and ensure lasting impact.

Specific Tools Required:

The training requires a set of specific tools to ensure an engaging and interactive learning experience. Screen and audio equipment are recommended for watching films and listening activities, while internet access is essential for exploring suggested online resources. For face-to-face sessions, general teaching materials include PPT slides in the SiT design, worksheets, posters or infographics, as well as printed flashcards with key terms and closed-loop confusion cards. Whiteboards or large A3 paper with coloured pens support group work and visual exercises. Role cards, presented as short one-page briefs with defined goals and limits, help structure role-play activities, while a timer is useful for keeping the pace of tasks. Finally, a flipchart can be used to capture and summarise key takeaways,

and an A3 Closed Loop Canvas template—customisable for learners—provides a structured framework for applying circular economy concepts in practice.

3.3 Phase 2: BLENDED TRAINING and Phase 3 - WORK-BASED LEARNING

The training design combines innovative and learner-centred methodologies aimed at integrating theoretical knowledge with practical application. It includes synchronous and face-to-face activities, collaborative work, and opportunities for participants to apply their learning in real professional contexts.

3.3.1 Blended Learning Phase

The blended phase integrates face-to-face sessions with online learning components, creating a flexible and engaging learning environment that supports both individual reflection and collaborative exchange. This phase is grounded in transformational and active learning approaches, drawing on social identity theory, empathy-based learning, and project-based pedagogies.

During in-person sessions, learners will be involved through group discussions, role-playing, case study analyses, and other interactive methods described in the training toolkit. These activities are designed to stimulate reflection, foster teamwork, and strengthen learners' capacity to translate theoretical concepts into practical, real-world applications.

A particular focus will be placed on the systematic use of case studies, which provide detailed analyses of real or realistic scenarios from national and sectoral contexts. When appropriately structured and supported by guiding questions, case studies help participants to grasp key strategies and concepts while enhancing critical thinking, problem-solving, and decision-making skills.

3.3.2 Project-Based Learning Phase

A fundamental component of the programme is the project-based learning phase, through

which both higher education students and professionals—particularly SME owners and workers in the textile sector—will engage with real challenges related to the green transformation of the TCLF sectors. Learners will be guided to design and develop innovative, sustainable solutions that can be implemented within their own or partner enterprises, thereby contributing to local development and environmental sustainability.

This phase ensures:

a) a learner-centred and problem-oriented approach, promoting active engagement and creativity; and

b) the development of entrepreneurial, innovation-oriented, and practical competencies, enabling participants to create new solutions, products, and services aligned with sustainability goals and market demands.

To support these activities, participants will be provided with structured templates, detailed work plans, and access to online collaboration platforms (such as Basecamp), which facilitate teamwork, transnational cooperation, and peer learning.

An integral part of this phase is the International Bootcamp, organised by OECON in Greece with the cooperation of AKMI (see next section). Conducted in a hybrid format, the Bootcamp will gather participants from various European countries—both online and face-to-face—for an intensive, hands-on, and collaborative learning experience. Its purpose is to allow learners to co-design innovative and interconnected green business projects, in line with the green transition of the TCLF sectors.

3.3.3 Work-Based Learning Phase

The work-based learning phase represents the practical implementation of the competences acquired in previous stages. In this phase, the involvement of textile SMEs and sector representatives is fundamental, as they will collaborate with HE and VET providers to identify and engage TCLF MSMEs capable of hosting trainees and learners during their work-based experiences.

SiT will promote a range of activities—such as placements for HE students in textile companies, job-shadowing opportunities, study visits, B2B workshops, and networking

events—for both HE and c-VET learners. Supported by trained tutors, each participant will develop a personal work-based project, implemented in cooperation with the hosting enterprise.

The training methodologies adopted during this phase will be aligned with the principles of EQAVET (European Quality Assurance in Vocational Education and Training) and ESG (Standards and Guidelines for Quality Assurance in the European Higher Education Area), as well as the findings of the previous phases. The methodology will clearly associate learning outcomes with learning objectives and define the framework for the use and adaptation of training content in practical settings.

Across all components, the training materials and activities will be developed in full compliance with European and national accessibility standards, ensuring that learning remains inclusive, equitable, and accessible to all participants.

3.4 The International Bootcamp

The International Bootcamp, organized by OECON Group in Thessaloniki (Greece) with the collaboration of AKMI, represents a key milestone within the project's training pathway. Designed as a 10-hour hybrid training event (1.5 days), it will engage 8 participants per country—5 online and 3 in presence—except for Slovakia. Trainers from OECON and AKMI will conduct the sessions, while ICEP will contribute with two trainers specialized in competence recognition and validation.

The Bootcamp aims to equip c-VET learners and professionals from the TCLF sectors with the necessary skills to develop and expand their business activities internationally, in line with green and open innovation principles. Participants will work collaboratively to design innovative projects focused on the green transformation and sustainable growth of TCLF enterprises, contributing to local and international development.

This initiative also promotes transnational cooperation and mobility, allowing participants to collaborate with peers from other EU countries during the project-based learning phase. The Bootcamp will provide a practical and interactive environment where participants will co-create interconnected and sustainable business ideas.

To support the training, the organisers will make available various tools, including a project design template, a detailed work plan, and an online collaboration platform (such as Basecamp) to facilitate group work and exchange among participants.

4. RECOMMENDATIONS FOR VALIDATION, ACCREDITATION AND RECOGNITION

This part is focused on developing a framework for transnational certification, accreditation and recognition with recommendations for the training provided by project SiT. This is an important step in ensuring that the training is recognized and valued by stakeholders in the TCLF sector. By aligning the certification and accreditation of the training with the EQF, ECTS standards, and micro credentials, the project can ensure that the training meets high quality and transparency standards. It will help to ensure that learners are able to demonstrate their skills and knowledge effectively to potential employers or further education providers. By setting a procedure for national accreditation for VET training and pursuing it throughout the project lifetime, the project can ensure that the training is recognized and valued at the national level as well. Including the final policy recommendation with the accreditation procedure will also help to ensure that the framework is sustainable and can be implemented beyond the project lifetime. Overall, the development of a framework for transnational certification and accreditation is a critical component of the project. By ensuring that the training is recognized and valued, the project can help to support the development of a skilled workforce in the TCLF sector and contribute to its growth.

In line with European standards for the recognition and validation of learning outcomes, the Europass Mobility document is used to formally record the knowledge, skills, and competences acquired by participants during their transnational learning experiences within the SiT project.

Specifically, the SiT consortium uses Europass Mobility to document the competences developed during the International Bootcamp. The document includes essential information such as the dates of implementation, the content of the training activities, and the learning outcomes achieved by each participant.

It is jointly compiled by the sending and hosting organisations, ensuring the accuracy and transparency of the recorded information. This process provides participants with an official

European certification of their mobility experience, serving as a formal recognition of their participation and learning achievements in an international training context.

4.1 Basic Conceptualization

The project aims to develop a European reference framework for the definition and recognition of two professional profiles. A brief explanation of the relationship between national and European classification systems is provided at the beginning of this document. These profiles may be subject to specific national laws and regulations, and each country has its own systems and lists of recognised professions. It is therefore up to the institution implementing these profiles to ensure their alignment with the national regulatory and professional framework. The timelines and procedures for structuring a new professional profile vary significantly from one country to another. In most cases, it is necessary to refer to a designated authority or institution responsible for such processes. These bodies typically require a range of supporting materials that demonstrate the relevance, necessity, and practical applicability of the proposed professional profile. In some cases, concrete data and case studies must also be provided. Crucially, the active involvement of the labour market is often a key requirement. In other words, strong support from multiple stakeholders is essential to justify the establishment of two new professional profiles. These stakeholders may include representatives from the labour market, professionals, and actors from the education and training sectors.

4.2 The Inclusion of the European Qualification Framework (EQF)

It is necessary to seek the inclusion of the two professional profiles within the European Qualifications Framework (EQF). As the procedures and systems may vary from country to country, it is important to consult the relevant national authorities or institutions to understand how to proceed with recognition and alignment.

4.3 Assessment methods and techniques

As discussed during the relevant sessions, each project partner may decide to what extent the online courses should be differentiated for the two professional profiles: the Recycling Manager (EQF Level 6) and the Bio-Textile Technician (EQF Level 5). In contrast, the in-person sessions will be specifically designed to highlight the distinct characteristics of the

two roles. Even in the case of joint sessions, it will be the responsibility of the training coordinators to tailor the assessment activities according to the target profile.

A dedicated project framework has been structured with the objective of providing consistency and homogeneity to the applied methods. This framework, included as Annex 3, serves as a reference document to guide the certification, validation, recognition, and accreditation of the training developed within the project.

The framework draws on the work of ICEP – Institute of European Certification of Personnel, which has extensive expertise as an accreditation, certification, and qualification body, with more than 15 years of experience in the recognition and validation of competences. ICEP's approach is grounded in international standards (ISO/IEC 17024) and ensures independence, competence, and impartiality in the certification process.

This structured protocol is aligned with the European Qualifications Framework (EQF), European Credit Transfer and Accumulation System (ECTS) standards, and the emerging system of micro-credentials. Such alignment guarantees transparency, quality assurance, and comparability across national and European levels, strengthening the credibility of training outcomes.

The Certification Protocol, as part of the framework, outlines procedures to:

- validate and certify competences acquired through both formal and non-formal learning,
- create clear certification and validation pathways tailored to the TCLF sector,
- enhance the employability and recognition of new professional profiles introduced by the project (e.g., Recycling Manager – EQF level 6, Bio-Textile Technician – EQF level 5),
- ensure that learning outcomes can be effectively demonstrated to employers and educational institutions.

Furthermore, the framework integrates guidance from European policy, particularly the Council Recommendation on the validation of non-formal and informal learning (2012/C 398/01), ensuring its relevance and sustainability beyond the project's lifetime. By incorporating cross-references with ESCO (European Skills, Competences, Qualifications

and Occupations) and other European competence frameworks, the Certification Protocol becomes a dynamic tool that can evolve in step with the needs of the sector and labour market.

Ultimately, this framework contributes to the creation of a common and transparent system for competence recognition in the TCLF sector, supporting mobility, lifelong learning, and the development of a skilled workforce in Europe.

Moreover, the project foresees the establishment of local evaluation committees to ensure the validation process of acquired learning outcomes. Each committee must consist of at least five members, all of whom should possess expertise in the subjects related to the various modules that make up the two professional profiles. The committees will operate according to an evaluation grid defined at the project level, as well as shared criteria established within the framework of the project. They will also adapt the evaluation scales and assessment tests to the specific characteristics of the local context in which they operate. To ensure consistency in the assessment process across countries and professional profiles, it is strongly recommended that the evaluation parameters be shared among the different committees. Moreover, as the SiT project foresees a blended training approach, local evaluation committees will be established to ensure the validation process of acquired learning outcomes at national level.

Below is provided a set of suggested assessment methods that can be used for this purpose, differentiated by professional profile.
Practical tasks or simulations conducted in lab or workplace settings, including hands-on exercises using recycled materials specific to the textile industry.

1. **Bio-Textile Technician**

- Practical assessments on the potential use and risks of textiles and chemical products
- Skill checklists for step-by-step performance evaluation
- Multiple-choice or technical quizzes
- Task-based assignments or mini-projects
- Portfolio of practical evidence, including documentation and reports

2. **Recycling Manager**

- Case study analysis and solution proposals
- Presentations or strategic pitches
- Self-assessment and reflective report
- Peer evaluation in group activities, also mix with technician
- Role-plays and decision-making simulations

Some recommendations: It is important to ensure that assessment methods are clearly explained and illustrated to participants from the outset. Clear evaluation rubrics must be developed to allow for objective comparisons—both in terms of the achievement of learning outcomes and the results obtained by different participants.

4.5 Recommendations for the Accreditation and Validation

An intermediate step—also with a view to the possible future formal recognition of a professional profile—is the use of acknowledgements and certifications linked to the project, which can be recognised by stakeholders in the labour market and education sector as micro-credentials.

Steps toward the recognition of a new professional profile:

1. Understand national procedures.
   Recognition processes vary significantly between countries. It is essential to investigate how new professional profiles are regulated in each national context.

2. Identify the competent authority.
   In most cases, a specific institution or public body is responsible for evaluating and approving new profiles. Contacting this authority is a necessary first step.

3. Prepare supporting documentation.
   Authorities often require detailed materials proving the relevance, necessity, and feasibility of the proposed profile. This may include needs analyses, role descriptions, and sector-specific data.

4. Collect evidence and case studies.
   In some countries, concrete examples and data demonstrating the practical application of the profile are needed to support the request.
5. Engage key stakeholders.
   Broad support from the labour market and the training sector is crucial. Professionals, employers, and education providers should be involved from the beginning to endorse the profile.
6. Use intermediate forms of recognition (optional but strategic).
   Before formal recognition, it is possible to issue project-based certifications or acknowledgements that can serve as micro-credentials. These are particularly useful to demonstrate value and gain early adoption by employers and educators.

Micro-credentials

Micro-credentials are playing an increasingly important role in the recognition of skills and competencies across Europe, particularly in relation to non-formal and informal learning. This growing focus has been formalised through the Council Recommendation of 16 June 2022 on micro-credentials, which promotes their use as flexible and accessible tools for certifying specific competencies, thereby enhancing employability and social inclusion.

In line with this European approach, the project aims to clearly define and structure the competencies related to the two professional profiles involved, with the goal of developing context-appropriate micro-credentials aligned with the European Qualifications Framework (EQF).

To explore this topic in greater depth, we have consulted experts in the field, who have highlighted the importance of carefully studying national legislation in advance. Each participating organization is therefore invited to conduct a thorough national-level analysis to understand how micro-credentials can be requested, issued, and recognized within their country's legal and educational framework. The analysis concerning micro-certificates will be summarized in a separate document, which will include final policy recommendations at the national level from each project partner.

This process will take place at the end of the first phase (e-learning), as it is the most comparable and standardized part of the training across countries. At the conclusion of this

phase, participants will receive recognition for their achievements, and the related micro-credential and corresponding digital badge will specifically refer to the learning outcomes and competencies developed during this initial phase.

ANNEX 1

Collection of methods and activities for the Face-to-Face phase

Table of Content

Instructions for Face-to-Face material

This session reinforces the e-learning content through **collaborative, experiential learning**. Activities are designed to foster applied understanding, encourage peer learning, and stimulate reflection on real-world practices in the textile and fashion industry. Training providers are encouraged to adapt the timing and structure to suit their learners.

Learning Environment

- ✔ **Mode of learning:** blended learning
- ✔ **Type of Venue:** Training center, classrooms, lab-equipped classroom or university lab
- ✔ **Classroom Setup:** Flexible seating (group clusters or U-shape), whiteboard, projector, access to water/electrical supply for lab use
- ✔ **Required Equipment:** Projector, printed worksheets, fabric swatches, lab equipment, laptop and similar
- ✔ **Group Size:** Optimally 10–15 participants to ensure engagement and access to materials

The training material for the face-to-face training

Each unit's face-to-face delivery will use a PPT presentation designed in the SiT template, enriched with the option of:

- ✔ **Practical assignments** and short in-class projects
- ✔ **Tables and comparison charts**
- ✔ **Graphs and infographics** (e.g. environmental impact metrics)
- ✔ **Pictures** of processes, machines, and outputs
- ✔ **Templates and worksheets** (e.g. for process analysis, decision grids)
- ✔ **Case examples** with links to video or industrial best practices

How Training Providers Can Organize the Training

1. Modular Delivery Format

- The program is divided into thematic units, each integrating lectures (knowledge-based) with structured practical/lab/project tasks (skills- and competence-based).
- Suggested delivery is over 2–3 consecutive days, or spread across 1 week with alternating theory and application.

2. Balanced Time Allocation
   - Total duration: lectures (core knowledge, key concepts, guided discussions) + practicals/project-based tasks (lab work, group case studies, simulations)
3. Learning Flow per Unit

   Each unit follows this sequence:
   - Brief interactive lecture (incl. PPT, visuals, problem questions)
   - Guided activity or lab task
   - Group reflection or discussion to consolidate understanding
   - Short wrap-up or quiz to assess key takeaways
4. Support Materials
   - Training materials include:
     - PPT slides (SiT template)
     - Printed worksheets, checklists, comparison charts
     - Case study examples (from industry practice)
     - Infographics and templates for lab data or group presentations

This micro-qualification program adopts a blended face-to-face approach, combining concise lectures, interactive discussions, collaborative group work, hands-on laboratory tasks, and case-based learning. The aim is to build not only foundational knowledge, but also practical competence and sustainability-focused decision-making skills.

Module 0 - Sustainability Fundamentals -Suggested structure and activities

Activity 1: Mapping circular business models

Learning units addressed: Unit 1 and 2 (Sustainable Economic Practices and Resource Management)

Objective: To understand the principles of the circular economy through a practical group activity that reimagines a fashion collection from a linear to a circular model.

Instructions:

1. Introduction (10 minutes):
   Participants read the background text provided below. The trainer briefly introduces the task and the key idea of circular economy.
2. Group Work (15 minutes):
   Participants are divided into groups of 3–4. Each group receives the scenario of a fashion brand currently operating under a linear model. Their task is to brainstorm how to redesign this collection using circular economy principles.
3. Group Presentations (5 minutes):
   Each group presents 1–2 key ideas from their circular strategy redesign.

Materials:

1. Background Reading for Participants (approx. 5 min): Circular Economy in the Textile Industry
2. Worksheet for Group Work: Scenario – "LUMA Fashion House"

Circular Economy in the Textile Industry

1. Introduction

The circular economy is a model that opposes the traditional linear approach of "take-make-consume-dispose". In the textile industry, this means designing products that last longer, can be reused, repaired, repurposed, or recycled.

Core principles of the circular economy include:
- Design for longevity: selecting materials and styles that ensure a longer product life.
- Use of recycled and renewable materials: instead of conventional, resource-depleting inputs.

- Closed-loop systems: bringing used products back into the system for reuse or recycling.

- New business models: clothing rental, upcycling, second-hand platforms, etc.

Applying circular economy principles reduces waste, cuts CO_2 emissions, saves water and energy, and encourages sustainable behavior from both consumers and producers.

2. Applying Circular Economy in the Textile Industry

The textile and fashion industry is facing increasing pressure to reduce its environmental, social, and economic impacts. As a response, the circular economy (CE) model is emerging as a transformative solution. A circular economy moves away from the traditional linear "take-make-consume-dispose" model, focusing instead on minimizing waste, keeping products and materials in use, and regenerating natural systems.

3. Definition and Core Principles

According to the Ellen MacArthur Foundation, the circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the concept of end-of-life with restoration, uses renewable energy, eliminates toxic chemicals that hinder reuse, and seeks to eliminate waste through superior product and system design.

Three fundamental principles guide circular economy practices:
1. Design out waste and pollution
2. Keep products and materials in use
3. Regenerate natural systems

4. From Linear to Circular in Textiles

The current global clothing system operates in a predominantly linear fashion. Resources are extracted, turned into garments, briefly used, and then discarded—often in landfills or incinerators. Fast fashion accelerates this cycle, encouraging frequent purchasing and disposal.

A circular textile economy follows the 3R strategy: reduce, reuse, and recycle. It emphasizes durable design, alternative business models (e.g., rental, resale), and infrastructure to recover and reuse garments and materials.

5. Circular Applications Across the Textile Supply Chain

- Design phase: Products are designed for longevity, disassembly, and recyclability. Timeless styles and high-quality materials enhance durability and reduce waste.

- Production: Circular production avoids toxic inputs, minimizes waste, and often uses renewable energy. Waste from processes like cutting and dyeing is reclaimed and reused.

- Use and End-of-Life: Circular strategies include repair, resale, and recycling. Improved waste collection systems and reverse logistics support material recovery and extend product lifespans.

6. Benefits and Challenges

Benefits of circular economy practices include reduced greenhouse gas emissions, lower resource consumption, improved working conditions, and new employment opportunities. It also supports innovation and long-term competitiveness in the industry.

Challenges involve technical issues (e.g., mixed-material recycling), consumer habits, high costs of transition, and lack of supportive policy frameworks. Despite this, growing awareness and global initiatives are driving momentum for change.

7. Best Eco-Friendly Practices in the Fashion Industry

Practice	Key Elements	Examples
1. Sustainable Materials	Use of eco-friendly, renewable, or recycled fibers	Organic cotton, hemp, recycled polyester, Tencel, Pinatex, linen
2. Water Conservation	Reduce water use and pollution in production	Low-water dyeing, waterless processing, closed-loop systems, water stewardship
3. Renewable Energy	Use of clean, renewable energy in manufacturing and operations	Solar power, wind turbines, hydroelectric power, energy efficiency practices
4. Circular Fashion	Design for reuse, repair, recycling, and waste minimization	Design for circularity, product life extension, resale/rental, upcycling, waste reduction
5. Eco-Friendly Packaging	Sustainable materials and minimal packaging design	Biodegradable/recyclable packaging, minimal use, renewable production, green branding
6. Slow Fashion	Emphasis on quality, ethical practices, and conscious consumption	Ethical production, local sourcing, timeless design, consumer education
7. Technology for Sustainability	Tech to enable sustainable materials, design, and recycling	3D printing, digital design/printing, traceability systems, material innovation

8. Conclusion

The transition to a circular economy in the textile industry is essential for achieving environmental sustainability and social equity. While barriers remain, collaborative innovation, supportive regulations, and conscious consumer behavior can significantly accelerate progress. Circular fashion is not just a trend—it is a necessity for a more sustainable future.

Worksheet for Group Work

Scenario – "LUMA Fashion House"

LUMA is a fashion brand producing seasonal collections using conventional materials, selling products through fast fashion channels, and offering no options for repair or take-back. They now want to shift to a more sustainable, circular business model but are unsure where to start.

Instructions:

Your Group Task: Design the first steps of LUMA's transformation into a circular business.

Questionnaire

Discuss and write down your answers to the following questions:

1. **Design and Materials**: What changes would you suggest in the choice of materials and product design?

2. **Production and Distribution**: How can the production process become more circular?

3. **End of Product Life**: How can customers be encouraged to return, repurpose, or recycle products?

4. Bonus (optional): Could LUMA introduce new services (e.g., rental, resale, repairs)?

5. Write down 2–3 key ideas from your group:

- _____

- _____

Learning Outcomes:

- Students identify opportunities for circularity in fashion business models by analyzing materials, production, distribution, and end-of-life strategies.
- Propose sustainable design and material choices that reduce environmental impact and extend product life cycles.
- Generate innovative business ideas (e.g., rental, resale, repair services) that align with circular economy principles.
- Collaborate effectively in groups to discuss, prioritize, and present key strategies for business transformation.

2. Bio-Textile Technician

2.1. Module 1 - Bio-based textile material properties and processing techniques

Activity 1: Workshop: "Fast fashion under the microscope"

Objective: To develop an understanding of the ecological and economic challenges facing the textile industry.

Activities:

- **Group work:** Analysis of the life cycle of a T-shirt (CO_2, water, energy consumption).

- **Film example:** **https://www.youtube.com/watch?v=BiSYoeqb_VY**

  Why is this video so valuable for training?
  Visually understandable: The animated format makes complex information such as life cycle analyses are easily accessible.
  Versatile: Ideal for classroom teaching, as an introduction to workshops, or when discussing environmental impacts.
  Supports "aha" moments: The drastic figures (e.g., water consumption) encourage thought and reflection.
- **Discussion round:** "Why don't we recycle more?" – Obstacles and solutions.

- **Roles play : Stakeholder debate**
  Participants take on roles (brand, politics, consumer, recycler).
  Goal: Develop joint strategies for a more circular economy.

Materials: PPT (SiT design), worksheets, posters with key figures, moderation notes.

Learning Outcomes:
Analyze the ecological and economic challenges associated with fast fashion.
Evaluate the environmental impacts of textile production across the product life cycle (CO_2, water, energy).
Understand barriers to recycling and identify potential solutions for a circular economy.

Activity 2: Bio-based materials and their properties

Objective: Gain an overview of plant-based, animal-based, and cellulose-based materials.

Activities:

1. **Material stations: "What is in our textiles?"**
   Small groups examine samples (hemp, nettle, lyocell, wool).
   Create profiles: properties, advantages, challenges.

2. **Mini design challenge:**
   Task: Develop a product concept using at least two bio-based materials.
   Presentation and peer feedback from the group.

Materials: PPT, worksheets with material profiles, templates for profiles.

Learning Outcomes:

Identify and describe key plant-based, animal-based, and cellulose-based textile materials.
Compare material properties, advantages, and limitations.
Apply knowledge of bio-based materials to develop product concepts.

Activity 3: Innovative materials from food and agricultural waste

Objective: To learn about new material innovations and discuss their potential.

Activities:

1. **Innovation Lab: "From waste to textile"**
   Teams select an innovative material (e.g., Piñatex, apple leather, coffee grounds fiber).
   Task: Identify opportunities, challenges, and possible applications.

2. **Pitch presentation:**
   Groups present their material and make recommendations for action.

Learning Outcomes:

Explore novel textile materials derived from food and agricultural waste.
Assess opportunities, challenges, and potential applications of innovative materials (e.g., Piñatex, apple leather).
Collaborate in teams to develop recommendations for material use.

2.2. Module 2 - Chemistry for textile processing and dyeing with less environmental impact

Table 1: Organization of face-to-face activities by unit.

Unit	Title	Lecture Activities (approx.)	Practical / Lab Activities (approx.)	Planned Activity
1	*Introduction to Sustainability in Textile Wet Processing*	1.5 h	1.5 h	**Quiz + discussion:** Key sustainability metrics, impacts of conventional wet processing
2	*Principles of Green Chemistry in Textile Applications*	1.5 h	1.5 h	**Group workshop:** Matching green chemistry principles with textile processes
3	*Sustainable Dye Selection and Application*	1.5 h	1.5 h (lab)	**Lab:** Dyeing protein & cellulose fibres with natural and low-impact synthetic dyes
5	*Innovative Low-Impact Dyeing Technologies*	1 h	2 h (group work/project)	**Group project:** Comparative analysis of 2 innovative technologies (e.g. CO_2, plasma, foam)
4	*Pigments and Digital Printing as Water-Saving Technology*	1.5 h	1.5 h (lab/project simulation)	**Case study:** LCA comparison: rotary printing vs. digital **Lab:** comparative printing of untreated and cationized cotton: dyes vs. pigments

Activity 1: Compare & Recommend – Low-Impact Dyeing Technologies

Unit: Innovative Low-Impact Dyeing (Unit 5)
Time: 60–75 minutes
Type: Group activity (3–4 participants per group)

Each group receives printed profiles of two dyeing technologies (e.g. foam dyeing vs enzymatic pre-treatment). Using a template matrix, they compare the two in terms of:

- Water/chemical/energy use
- Fibre compatibility
- Process steps
- Scalability and cost
- Environmental benefit

Materials:

- Technology cards
- Comparison matrix (printed or digital)
- Reference handout (infographics, definitions)

Output:

Each group presents a 3-minute recommendation: *Which technology would they choose for a medium-sized dye-house and why?*

Activity 2: Role Play: Choosing a Sustainable Digital Printing Technology

Unit: Pigments and Digital Printing as Water-Saving Technology (Unit 4)
Duration: ~60–75 minutes
Type: Group role play (5–6 participants per group)

Objective: To explore the decision-making process in selecting a sustainable digital textile printing solution, balancing technical, environmental, and economic factors.

Scenario (Introduction for students):

A textile company is planning to upgrade its printing department to a more sustainable digital printing system. Management is deciding between two options:

- Aqueous dye-based inkjet system
- Pigment-based waterless digital printing

The decision will impact production setup, sustainability goals, budget, and product quality.

Roles (assigned randomly or chosen):

Role	Primary Concern / Perspective
Sustainability Manager	Focus on water/energy use, chemical discharge, regulatory compliance
Production Manager	Concerned with process speed, ease of use, existing equipment compatibility
Brand Representative	Interested in colour brilliance, fastness, sustainable marketing potential
Financial Officer	Cost of equipment, inks, training, ROI

Role	Primary Concern / Perspective
Digital Print Technician	Process complexity, maintenance, quality consistency
Customer (retailer)	Wants traceability, eco-labels, colour stability, and fast delivery

Instructions:

1. Each student receives a role card with:
   - Objectives
   - Key arguments
   - Data points to use (can be from course content)
2. In groups, students:
   - Debate the advantages and trade-offs of each technology
   - Try to reach consensus on the best option for the company
   - Document their final decision and justification (e.g. hybrid solution, phased transition)
3. One person presents the group's decision and main reasoning to the class.

Materials for Trainers:

- Printed role cards
- Summary table: pigment vs dye-based digital printing
- Decision-making worksheet
- Optional: visual of production flow for both systems

Learning Outcomes:

- Students understand real-world barriers and drivers in adopting sustainable digital printing
- They learn to argue from diverse stakeholder perspectives
- They apply their technical knowledge to justify environmentally and economically balanced solutions

Activity 3: Lab/Activity: Comparative dyeing of cellulose and protein fibres with natural and low-impact synthetic dyes

Description: To explore and compare the dyeing behaviour, environmental aspects, and fixing efficiency of natural dyes and low-impact synthetic dyes on **cotton (cellulose)** and **wool or silk (protein fibres)**.

Materials:

- Cotton and wool or silk fabric samples (equal weight)
- Natural dyes (e.g. madder, turmeric, onion skins, or food/agro-waste extracts)
- Low-impact synthetic dyes (e.g. high-fixation reactive dyes, or low-impact acid dyes)
- Mordants for natural dyes (alum, tannins – preferably bio-based)
- Dye baths (lab pots)
- Thermometer, pH paper, timer
- Dyeing machine
- Distilled water
- Optional: spectrophotometer or colorimeter for evaluation

Procedure (Simplified):

- Pre-wash and label fabric samples.
- Prepare natural and synthetic dye baths according to standard recipes.
- Apply natural dyeing with mordant (bio-alum or tannin) and low-impact synthetic dyeing separately on each fabric type.
- Maintain the same liquor ratio, pH, and temperature where possible for comparison.
- Rinse, dry, and evaluate dyed fabrics.

Learning Outcomes:

Students will:

- Record colour intensity, shade uniformity, and fibre-dye interaction
- Evaluate dye uptake and rinsing results (qualitative or quantitative)
- Reflect on environmental implications of each system (e.g. waste, pH, smell, residue)
- Optionally: test fastness with light washing/rubbing
- Complete a lab worksheet or short report comparing both dye systems

Activity 4: Case-Based Group Work - Compare and Evaluate Two Innovative Low-Impact Dyeing Technologies

Description: Students will collaboratively evaluate and compare **two selected low-impact dyeing or pre-treatment technologies**, analyzing their environmental performance, fibre compatibility, process requirements, and implementation barriers.

Instructions for Students:

1. Form a group of 3–4 members.
2. Select two technologies from the list below (or propose your own):
    - Foam dyeing
    - Supercritical CO_2 dyeing
    - Ultrasonic dyeing
    - Plasma pre-treatment
    - Ozone pre-treatment
    - Enzymatic pre-treatment
    - Air-dye technology
3. Research and compare the two technologies using the following criteria:
    - Environmental impact (e.g. water, energy, chemicals)
    - Fibre/material compatibility
    - Process steps (pre-treatment, fixation, drying, etc.)
    - Feasibility & cost factors (investment, scalability)
    - Examples of industrial use (e.g. DyeCoo, Imogo, Tonello)
4. Prepare a 5-minute group presentation with:
    - A comparative summary table or infographic
    - Key takeaways
    - A final recommendation: *Which technology would you recommend for a medium-sized cotton-based dyehouse transitioning to sustainable processes, and why?*

Deliverables:

- Presentation (slides or poster)
- Short reflection from each team member (*What did you learn and find most surprising?*)

Tip for Success:

Focus on real-world application. Don't just list pros and cons, consider which technology would best fit different production contexts (e.g. synthetic vs. natural fibres, batch vs. continuous dyeing).

2.3. Module 3 - Sustainable Production of Textile/ Clothing products

Table 1: Organization of face-to-face activities by unit.

Unit	Title	Lecture Activities (approx.)	Practical / Lab Activities (approx.)	Planned Activity
1	Methods for developing new materials from biofibres and microorganisms – comparative table	1 h	1 h	**research + discussion.** comparison of bio-fiber production methods – advantages and applications.
2	Research and application of testing procedures and quality assurance protocols. types of testing and purpose.	1 h	1 h	**role play:** familiarization with testing procedures and protocol development
3	Integration of traditional textile methods with modern eco-friendly practices and opportunities for optimizing their properties.	1 h	1 h	**group workshop:** group project work, technique presentation and application discussion
4	Life cycle assessment (lca) for waste reduction and resource utilization	1 h	1 h	**group workshop:** analysis of provided data related to a specific product. assessment and analysis.

Activity 1: Group Work - integration of traditional textile methods with modern eco-friendly practices and opportunities for property optimization

Unit: *Obtaining Fabrics from Bio-Renewable Sources. Fabric Properties* (Unit 3)

Time: 60 minutes

Type: Group activity (3–4 participants per group)

Instructions: Each group distributes activities among members, with each having the following responsibilities:

- Product design
- Material preparation
- Execution with type of manufacturing (weaving, knitting, needle felting)
- Dyeing and documentation preparation

Materials:

- Small hand looms, knitting hooks, needles for needle felting
- Yarns and fibers with different textures
- Natural dyes and containers for demonstrations

Output:

- Each group presents the created product, describes the techniques used, ecological practices and dye processing
- Brief discussion about possibilities for mass application or textile optimization

Activity 2: Role Play: Research and Application of Testing Procedures and Quality Assurance Protocols. Types of Testing and Purpose.

Unit: *Production and manufacturing types of* biofibers (Unit 2)

Duration: 60 minutes

Type: Group role play (5–6 participants per group)

Instructions:

Students are divided mainly into two teams (factory departments):

1. Material Testing Department – Department 1 (10-12 students)

2. Material Quality Protocol Development Department – Department 2 (10-12 students)

The teacher explains the objective: familiarization with material testing procedures and quality assurance protocols. A "factory case study" is presented: a new batch of fabrics needs to be checked before production.
Activity:

1. **In groups, students from Department 1:**
    1. Conduct "testing" (based on given data/simulation)
    2. Fill out Testing Protocol (sample form)
    3. Provide results in quantitative and qualitative form

Each student receives a card with:

• Data points to use (can be from course content)

• Testing Protocol form

2. **In groups, students from Department 2:**

   - Receive data from Department 1
   - Analyze whether the material meets standards (comparison with reference values)
   - Fill out Quality Assessment Form
   - MPrepare final decision for "acceptance" or "rejection" of the batch

   Each student receives a card with:

   - Data points to use (can be from course content)
   - Quality Assessment Form

3. **One person presents the group's decision and main reasoning to the class**
4. **Each group gives a brief summary: what they test/what they document**

Comparison of results and discussion of the importance of quality control

Materials for Trainers:

- Decision-making worksheet
- Forms with required data

Material testing protocol (department 1) with sample data

Material	Tensile strength (N)	Wash fastness (1–5)	Light fastness (1–5)	Shrinkage after washing (%)	Conclusion
Bacterial Cellulose (BC)	220	3	2	6%	No OK
Viscose	350	3	3	5%	No OK
Lyocell	420	4	4	2%	OK
Modal	400	4	4	3%	No OK
PLA fiber	300	3	3	4%	No OK

Mylo™	180	2	2	8%	No OK
Piñatex®	250	2	2	7%	No OK
Apple and Grape Waste	200	2	2	6%	No OK

Reference values:

Tensile strength (N): ≥ 400 N

Wash fastness (1–5): ≥ 4

Light fastness (1–5): ≥ 4

Shrinkage after washing (%): ≤ 2%

2. Quality assessment form (department 2)

Textile material quality assessment form

Assessment date: .....

Assessor: .....

Material/Sample: .....

Material	Tensile strength **(N/мм²)**	Wash fastness **(1-5)**	Light fastness **(1-5)**	Shrinkage **(%)**	**Rating**
Bacterial cellulose (BC)	200 – 300	2–3	3	5–15	Very high strength for biomaterial; shrinks significantly during drying; can be modified through impregnation or blending with other fibers.
Viscose	350	3	3	5%	Moderate strength, but above reference shrinkage
Lyocell	420	4	4	2%	Distinguished by high strength and good fastness properties – meets requirements
Modal	400	4	4	3%	Good performance, but shrinkage is above acceptable level

Material	Tensile strength **(N/мм²)**	Wash fastness **(1-5)**	Light fastness **(1-5)**	Shrinkage **(%)**	**Rating**
PLA fabric	300	3	3	4%	Moderate strength, does not meet requirements
Mylo™	180	2	2	8%	Very low performance, unsuitable
Piñatex®	250	2	2	7%	Poor strength and fastness properties
Apple waste	200	2	2	6%	Low performance, high shrinkage
Grape waste	200	2	2	6%	Similar to apple waste – unsuitable

Rating Legend (1-5):

1 – very low quality/poor performance

2 – low quality/weak durability

3 – average quality/acceptable durability

4 – good quality/good durability

5 – excellent quality/very good durability

Working Data (exemplary simulated results)

- Tensile strength: 450 N (good result)
- Wash fastness: 4 (minimum required)
- Light fastness: 3 (below standard)
- Shrinkage: 3% (above norm)

Analysis and Assessment:

Reference requirements: ≥400 N strength, ≥4 wash and light fastness, ≤2% shrinkage.

- Of all investigated materials **only Lyocell** fully meets the criteria – it has high tensile strength (420 N), good wash and light fastness (4) and shrinkage within acceptable limits (2%).
- **Modal** approaches the requirements (400 N, fastness 4/4), but has excessive shrinkage (3%), which makes it not fully suitable.

- All other materials show either low strength, or high shrinkage, or insufficient wash/light fastness. This makes them unsuitable for high-quality textile products.
- Alternative materials such as Mylo™, Piñatex®, apple and grape waste still have too low indicators for industrial application compared to classical fibers.

Final Conclusion: For practical application and production according to the specified reference criteria **Lyocell is the only material that can be considered suitable**. Modal is a potential candidate if a solution is found to reduce shrinkage. All other investigated materials do not meet the requirements and are more suitable for experimental or niche products, but not for mass use.

Learning Outcomes: **Familiarization with material testing procedures**

- Reading and analyzing results
- Familiarization with quality assurance protocols
- Understanding of indicators
- Application of knowledge for result analysis and making correct final decisions

2.4. Module 4 - Sustainable sourcing and supply chain for bio-based textile materials

Activity 1: Global Bio-Material Market Intelligence Workshop

Instructions:

1. Energizer Activity – Global Supply Chain Scan (15 min)

- Students use smartphones to scan **QR codes** linking to different bio-material producer websites.
- Immediate engagement with **real-world global supply chains** (cotton, hemp, mycelium).

2. Market Simulation Exercise (45 min)

- Teams of 4–5 students receive **different bio-material scenarios**:
  - Organic cotton from India
  - Hemp from Romania
  - Mycelium leather from the Netherlands
- Using **Harvard Business School case study methodology**, teams must conduct comprehensive **market assessments**.
- Tools/databases used:
  - Alibaba.com
  - Global Organic Textile Standard (GOTS) database
  - Textile Exchange market reports
- Task: Complete a **3-Layer Verification analysis** (source verification, certification, market demand check).

3. Team Presentations

- Each team presents their findings in **20 slides × 20 seconds**.
- Focus on **concise, impactful communication**.

4. Assessment & Feedback

- Students complete **peer evaluation forms**, rating presentations on:
  - Depth of market analysis
  - Data quality
  - Strategic recommendations
- Provides **formative feedback** and builds **critical evaluation skills**.

Materials:

- Smartphones with QR scanner apps
- Laptops with pre-configured bookmarks to:
  - Alibaba.com
  - GOTS database
  - Textile Exchange reports
- QR codes linked to producer websites
- Case study handouts with assigned material scenarios
- Peer evaluation forms
- Projector and presentation software

Learning Outcomes:

- Apply professional databases and tools to conduct real-time market analysis of bio-materials.
- Analyze and verify supply chain information through a structured 3-Layer Verification method.
- Evaluate international bio-material markets (cotton, hemp, mycelium) and identify sustainability and business opportunities.
- Collaborate effectively in teams to generate data-driven market insights.

Activity 2: Transport Logistics Optimization Challenge

Instructions:

1. Immersion Setup – Logistics Control Center (10 min)

- Classroom arranged as a **logistics control center** with workstations.
- Students receive **bio-material samples** (e.g., organic cotton, hemp bales, mycelium leather, natural dyes).
- Introduction to **material-specific requirements** (temperature, humidity, packaging).

2. Transport Optimization Challenge (45 min)

- Teams of 4–5 design **multi-modal transport solutions** for assigned bio-materials.
- Constraints: **budget, delivery time, carbon footprint limits**.
- Tools:
  - **Google Maps API** for route planning.
  - **Smart Freight Centre carbon calculators** for emissions analysis.
- Must account for **real-world logistics factors**:

    - Port capacities
    - Customs procedures
    - Seasonal/weather patterns

3. Blockchain Simulation – Digital Documentation (20 min)
- Teams use **tablets with blockchain simulation software** (e.g., simplified Maersk TradeLens).
- Tasks:
    - Create **smart contracts** for shipments.
    - Track goods through **real-time blockchain monitoring simulation**.
- Reinforces the importance of **digital transparency and traceability** in sustainable logistics.

4. Crisis Management Role-Play (25 min)
- Teams face simulated disruptions:
    - Port strikes
    - Temperature breaches
    - Customs delays
- Using **protocols and contingency planning**, they must adjust their transport strategy.
- Develops **critical thinking under pressure**.

Materials:

- **Bio-material samples** (organic cotton, hemp, mycelium, natural dyes)
- **Workstations** equipped with:
    - Temperature sensors
    - Humidity meters
    - Packaging materials
- **Digital tools**:
    - Laptops with Google Maps API access
    - Smart Freight Centre carbon calculators
    - Tablets with blockchain simulation software
- **Scenario cards** with budget, time, and carbon footprint limits
- **Evaluation sheets** (peer/team evaluation of solutions)

Learning Outcomes:

Analyze material-specific logistics requirements (temperature, humidity, packaging needs).
Design optimized multi-modal transport plans within financial, environmental, and time constraints.
Apply carbon footprint calculators to evaluate sustainability of logistics decisions.
Use blockchain-based digital tools to simulate trade documentation and real-time monitoring.
Respond effectively to transport disruptions using contingency planning and crisis management strategies.

2.5. Module 5 - Basic principles of biotechnology and bioengineering for bio-based textile materials

Activity 1: BioTextile Ideas Lab

Learning units addressed: Unit 1 (Introduction to Biotechnology and Bioengineering in the Textile Sector) and Unit 2 (Biofabrication and the Use of Microorganisms).

Objective: To explore real-world applications of biotechnology and biofabrication in the textile sector through collaborative analysis and creative thinking. Learners will identify key technologies and their environmental benefits using case studies and group discussion.

Activities

1. **Warm-up and concept recap**

   The trainer briefly revisits key concepts from Units 1 and 2 (e.g., biotechnology vs. bioengineering, microorganisms, enzymes, biofabrication). Learners are encouraged to ask questions and share examples they found interesting during the e-learning phase.

2. **Group formation and case study distribution**

   Participants are divided into small groups (3–4 people). Each group receives a short case study describing a real or fictional application of biotechnology or biofabrication in textiles (e.g., bacterial dyeing, mycelium leather, enzyme-based finishing).

3. **Case analysis and idea generation**

   Groups analyze their case using a guided worksheet:

   - What problem does the technology solve?
   - What biological process is used?
   - What are the environmental benefits?
   - How could this idea be expanded or improved?

4. **Creative pitch preparation**

   Each group prepares a short 3-minute pitch to present their idea as if they were proposing it to a sustainable fashion brand. They can use drawings, keywords, or diagrams to support their explanation.

5. **Group presentations and peer feedback**

Groups present their ideas to the class. After each presentation, peers and the trainer provide constructive feedback and ask questions to deepen understanding.

6. **Trainer-led reflection**

   The trainer facilitates a short discussion on the diversity of ideas, the feasibility of the proposals, and how biotechnology is shaping the future of textiles.

Trainer guidance:

- Use a short PowerPoint presentation (SiT template) to summarize key concepts from Units 1 and 2 (e.g., enzymes, microorganisms, biofabrication).
- Encourage participants to reflect on real-world examples they encountered during the e-learning phase.
- Distribute printed case studies and worksheets to guide group analysis.
- Support groups during the idea generation phase by asking open-ended questions (e.g., "How could this be scaled?", "What sustainability impact does this have?").
- Ensure each group has time to prepare a short pitch and provide basic materials (paper, markers, etc.).
- Facilitate peer feedback by modeling constructive comments and encouraging curiosity.
- Lead a final reflection to connect ideas with broader industry trends and sustainability goals.

Materials:

- Slides with clear visuals (e.g., diagrams of enzymes, microorganisms, biofabrication processes).
- Printed case studies (real or fictional) describing biotechnological textile innovations.
- Group worksheets for case analysis and idea development.
- Basic materials for sketching or visual support (paper, markers, post-its).
- Timer or clock to manage group work and presentations.
- Feedback forms or a simple peer review template.

Learning Outcomes:

- Participants will strengthen their understanding of key biotechnology and biofabrication concepts through collaborative analysis.
- Participants will be able to identify and explain real-world applications of biological processes in textile innovation.
- Increased confidence in presenting sustainable textile ideas using scientific reasoning and creative thinking.
- Improved teamwork and communication skills through group work and peer feedback.

Activity 2: Designing a Biofabricated Prototype

Learning units addressed: Unit 2 (Biofabrication and the Use of Microorganisms) and Unit 3 (Nanotechnology Applied to Bio-Based Textiles).

Objective: To apply knowledge of microorganisms and nanomaterials by designing a conceptual prototype of a sustainable textile product. Learners will integrate biofabrication techniques and functional enhancements through group work and guided design thinking.

Description:

1. **Introduction and inspiration**

   The trainer presents a short visual showcase (PPT or video clips) of innovative biofabricated and nanotech-enhanced textile products (e.g., bacterial cellulose garments, mycelium leather, hydrophobic nanocoatings). Learners are encouraged to take notes on features they find inspiring.

2. **Group formation and challenge briefing**

   Participants are divided into small design teams (3–4 people). Each team receives a design brief: *"Create a concept for a sustainable textile product using biofabrication and/or nanotechnology that solves a real-world problem (e.g., waste, water use, durability, antimicrobial needs)."*

3. **Research and ideation**

   Teams brainstorm and sketch ideas using a guided worksheet:
   - What biological materials or microorganisms will be used?
   - What fabrication process will be applied (e.g., fermentation, bioprinting)?
   - Will nanotechnology be integrated? If so, how?
   - What is the product's function and sustainability impact?

4. **Prototype concept development**

   Teams create a visual or physical mock-up of their prototype using drawing materials, collage, or digital tools. They also prepare a short explanation of the science and sustainability behind their design.

5. **Gallery walk and peer feedback**

   Teams display their prototypes around the room. Participants walk around, view each concept, and leave feedback using sticky notes or a feedback form (e.g., "What I liked", "What I'd improve", "Questions I have").

6. **Trainer-led reflection and wrap-up**

The trainer facilitates a discussion on the diversity of ideas, the feasibility of the designs, and how biofabrication and nanotechnology can be combined in real-world textile innovation.

Trainer guidance:

- Begin with a visual presentation (SiT template) showing examples of biofabricated and nanotech-enhanced textiles.
- Provide design briefs and worksheets to guide the creative process.
- Encourage teams to think holistically: material choice, fabrication method, functionality, and sustainability.
- Offer support during the ideation phase by suggesting relevant technologies or processes.
- Provide basic prototyping materials (paper, collage tools, digital sketching apps if available).
- Organize a gallery walk and guide participants in giving constructive peer feedback.
- Conclude with a discussion on feasibility, innovation, and how these ideas could be developed further.

Materials:

- Visual presentation (PPT) with examples of biofabricated and nanotech-enhanced textiles.
- Design briefs with sustainability challenges and user needs.
- Worksheets to guide ideation (e.g., materials, processes, functionality, impact).
- Drawing and prototyping materials (paper, colored pens, scissors, glue, magazines for collage).
- Optional: access to digital tools for sketching or mock-up creation.
- Sticky notes or feedback forms for the gallery walk.

Learning Outcomes:

- Participants will apply theoretical knowledge to design a conceptual bio-based textile product.
- Participants will understand how to integrate biofabrication and nanotechnology in product development.
- Enhanced ability to communicate scientific and sustainability concepts through visual and verbal presentation.
- Development of creative problem-solving and design thinking skills in a sustainability context.

Activity 3: Technical Debate – Biotechnology vs Nanotechnology

Learning units addressed: Unit 1 (Introduction to Biotechnology and Bioengineering in the Textile Sector) and Unit 3 (Nanotechnology Applied to Bio-Based Textiles).

Objective: To develop critical thinking and argumentation skills by engaging in a structured debate on the comparative advantages, risks, and sustainability of biotechnology and nanotechnology in the textile industry.

Description:

1. Topic introduction and group assignment

The trainer introduces the debate topic: *"Which technology offers greater potential for sustainable innovation in the textile sector: biotechnology or nanotechnology?"* Participants are divided into two teams, each defending one side of the argument.

2. **Research and argument preparation**

Each team receives a set of guiding questions and resources (e.g., printed articles, graphs, case studies). They prepare their arguments, including:

- Key advantages of their assigned technology
- Examples of successful applications
- Environmental and economic impact
- Potential risks or limitations

3. **Structured debate**

The debate is moderated by the trainer and follows a timed format:

- Opening statements (2 minutes per team)
- Rebuttals (2 minutes per team)
- Open discussion (10 minutes)
- Closing statements (1 minute per team)

4. **Audience voting and feedback**

The rest of the class acts as the audience, voting on which team presented the most convincing case. They also provide feedback on clarity, evidence, and teamwork.

5. **Trainer-led debrief**

The trainer facilitates a reflection on the strengths and weaknesses of both technologies, encouraging learners to consider how they might be combined in future textile innovations.

Trainer guidance:

- Introduce the debate topic clearly and assign teams with balanced perspectives.
- Provide curated resources (articles, graphs, case studies) to support argument development.
- Encourage teams to prepare structured arguments and anticipate counterpoints.
- Moderate the debate fairly, ensuring equal speaking time and respectful interaction.
- Use a simple rubric for audience voting and feedback (e.g., clarity, evidence, persuasiveness).
- Facilitate a debrief that highlights the strengths and limitations of both technologies.
- Encourage learners to reflect on how both approaches could be complementary in textile innovation.

Materials:

- Debate topic slide and structure overview (PPT).
- Printed or digital resources: articles, infographics, case studies comparing both technologies.
- Team preparation worksheets (argument mapping, evidence collection).
- Debate rubric for audience voting (clarity, evidence, persuasiveness).
- Whiteboard or flipchart for capturing key points during the debate.
- Reflection prompts for the debrief session.

Learning Outcomes:

- Participants will deepen their understanding of the strengths and limitations of both biotechnology and nanotechnology.
- Participants will develop critical thinking and argumentation skills using evidence-based reasoning.
- Increased ability to articulate and defend a technical position in a structured, respectful debate format.
- Greater awareness of how different technologies contribute to sustainability in the textile sector.

Activity 4: Professional Simulation – Consulting for a Textile Company

Learning units addressed: Unit 1 (Introduction to Biotechnology and Bioengineering in the Textile Sector), Unit 2 (Biofabrication and the Use of Microorganisms) and Unit 3 (Nanotechnology Applied to Bio-Based Textiles).

Objective: To synthesize the knowledge acquired across all units in a role-play simulation where learners act as sustainability consultants. They will propose bio-based solutions to a fictional textile company aiming to transition to more sustainable practices.

Description:

1. **Role assignment and scenario introduction**

   Participants are divided into small consulting teams (3–4 people). Each team receives a client profile: a fictional textile company looking to transition to more sustainable production. The profiles vary in size, market focus, and sustainability challenges (e.g., water use, chemical dyes, durability, waste).

2. **Client needs análisis**

   Teams analyze their client's profile and identify key sustainability challenges. They use a guided worksheet to define:
   - Current production issues.
   - Potential areas for innovation.
   - Relevant biotechnological or nanotechnological solutions.

3. **Solution design and strategy development**

   Teams develop a consulting proposal that includes:
   - Recommended technologies (e.g., enzyme treatments, bacterial dyeing, nanocoatings).
   - Expected environmental and economic benefits.
   - Implementation steps and potential risks.
   - Visual aids (e.g., diagrams, mock-ups, process flow).

4. **Client presentation simulation**

   Each team presents their proposal to the class, acting as if they were pitching to the company's board. Presentations are limited to 5–7 minutes and should be clear, persuasive, and technically sound.

5. **Feedback and trainer-led debrief**

   After each presentation, the trainer and peers provide structured feedback using a rubric (e.g., clarity, feasibility, innovation, alignment with client needs). The session ends with a group reflection on the challenges of applying technical knowledge in real-world business contexts.

Trainer guidance:

- Prepare fictional client profiles with varied sustainability challenges and production contexts.
- Guide teams through the analysis phase using structured worksheets.
- Encourage realistic and innovative proposals that integrate biotechnology, biofabrication, and nanotechnology.
- Support teams in preparing clear and persuasive presentations using the SiT template.
- Use a feedback rubric to evaluate proposals (e.g., relevance, feasibility, innovation).
- Facilitate a final discussion on the challenges of applying technical knowledge in business settings.
- Highlight transferable skills such as teamwork, communication, and problem-solving.

Materials:

- Client profiles with fictional company backgrounds and sustainability challenges.
- Consulting proposal templates (problem analysis, solution design, implementation plan).
- Slides with examples of biotech and nanotech applications in textiles (optional).
- Presentation template (SiT format) for team pitches.
- Evaluation rubric for feedback (e.g., innovation, feasibility, alignment with client needs).
- Reflection worksheet or discussion prompts for the final debrief.

Learning Outcomes:

- Participants will integrate knowledge from all three units to solve real-world sustainability challenges.
- Participants will gain experience in developing and presenting consulting proposals for industry clients.
- Improved ability to assess the feasibility and impact of biotechnological and nanotechnological solutions.
- Strengthened professional skills such as teamwork, strategic thinking, and client-oriented communication.

2.6. Module 6 - Quality Control and testing methods for bio-based textile products

Structure of content/activities

Time/hrs	Content / Activity	Format
0.5	Welcome, Objectives	Plenary
1.0	**Unit 1:** Quality Control & Quality Assurance - PPT & Q&A	Presentation, Q&A
1.0	**Activity 1:** Defining "Quality" in Bio-based Textiles	Group Work
1.0	**Unit 2:** QC in Production Chain - Checkpoints & Protocols	Case Study, Discussion
1.0	**Activity 2:** Designing a Sampling Protocol (Workshop)	Group Project
1.0	**Unit 3:** Environmental Standards & Certifications	Presentation
1.0	**Role-play:** Certification Audit Simulation	Role-play
1.0	**Unit 4:** Lab Testing Methods for Bio-based Fibers	Demo/Video, PPT
1.0	**Unit 5:** Special Testing (Biodegradability & Compostability)	Workshop/Discussion
1.5	**Integration:** Interpreting Test Results/Impact Assessment	Group Assignment, Peer Review
0.5	Wrap-up, Feedback, Q&A	Plenary

Activity 1: Group Workshop – Mapping Quality Checkpoints

Objective: Understand QC checkpoints along the bio-based textile chain.
Format: Small group work (4-5 per group)
Duration: 45 - 60 minutes (40 minutes for work + 10-15 minutes for presentation and discussion)

Description:

1. Each group receives a production flowchart (raw material → fiber → yarn → fabric/knitwear → finishing → product → packaging, A3 format per group).
2. Use coloured post-its to mark **QC checkpoints**.
3. Attach "control cards" explaining what to check (e.g. moisture, defects, bio-content).
4. Present group map to the class.

Materials: Printable flowcharts, sticky notes, marker pens.

Facilitation Notes: Prompts to guide discussions in group:

- Where are defects most likely to occur?
- Where should sampling be prioritized?
- How does control differ for bio-based vs. conventional?

Examples of materials produced

a) Quality Control Checkpoint Map Sheet (A3)

- Flowchart with blank space for sticking notes at each stage of the process.

b) Control Card (example to fill in):

QC Point	What to control	Method/Criteria

After the activity

- Summarize the main insights from each group.
- Highlight the different approaches and the logic behind why certain control points were selected or skipped.
- Write down the most common questions for the plenary discussion after the activity.
- Prepare photos of the produced flowcharts for later sharing (or group report) if possible.

Activity 2: Role-play - Certification Body Audit Simulation

Objective: Understand certification, traceability, and audits.
Format: Role-play ("auditors", "factory staff", "QA manager")

Description:

1. Trainer distributes a mock case file (incl. procedures, test results, inventory logs).
2. Auditors prepare a list of questions/checks (criteria from Oeko-tex, GOTS, etc.).
3. Factory staff and QA manager answer, provide documentation (templates supplied).
4. Auditors give feedback: is certification granted?

Materials: Audit check list template, documentation samples, evaluation rubric.

Facilitation Notes:

- Encourage the "factory" to provide and justify documents.
- Debrief: What went well? Where was the documentation weak? Implications for QC.

Reflection Worksheet (Reflection Form)

After the Workshop assignment/task, complete the following:

1. What parts of the activity worked well?
2. What challenges or problems arose?
3. What did you learn about the QC process or certifications?
4. How would you improve the next similar assignment?
5. What additional support or information would I like for future assignments?

Space for additional comments: _____

2.7. Module 7 - Digitalization in fashion eco-system through digital design, simulation and visualization in fashion industry

Activity 1: Digital Workflow Challenge

Duration: 90 min (can be adapted to 60 min)
Unit links: Unit 1 (Fundamentals of Digital Design) + Unit 4 (Digital Patternmaking & CAD-to-Manufacture)

Learning Goals

- Practice the end-to-end digital workflow (Concept – Digital Sketch – CAD/3D – PLM).
- Understand how accurate inputs (fabrics, sizing, file-naming) affect sustainability and efficiency.

Preparation for Trainers

- Prepare a PPT (SiT template) summarizing:
  - 4-step digital design process (Concept – Digital Sketch – CAD/3D – PLM).
  - Key sustainability figures (e.g., 70% less sampling, 30% less fabric waste).
- Prepare short case slides: *"Brand A's mistake in file versioning"* or *"Brand B's success in cutting waste"*.
- Prepare a worksheet (A3) showing a sample PLM "tech pack" template.

Description

1. **Kick-off (15 min)**
   Present a quick scenario: *"A brand wants to launch a 6-piece capsule collection with minimal waste."*
2. **Group Work (40 min)**
   - Divide participants into teams of 4-5.
   - Each team chooses: one garment type, fabric, and size range.
   - Using laptops/tablets (or printed templates if no software), they sketch digitally, set basic measurements, and fill a mock tech pack.
3. **Peer Exchange (20 min)**
   - Teams swap plans and identify potential bottlenecks (e.g., missing fabric physics data, unclear version control).
4. **Wrap-up (15 min)**
   Discuss how early digital accuracy prevents errors and waste.

Trainer Tips

- Provide a **digital mood board link** (e.g., Pinterest board) for concept inspiration.
- Encourage learners to use any 2D CAD demo (e.g., free trial of CLO or Lectra, or browser-based TUKAcad demos if available).

Activity 2: Virtual Fit & Sustainability Lab

Duration: 2 hours
Unit links: Unit 2 (3D Garment Simulation & Virtual Sampling) + Unit 3 (Digital Visualization & Photorealistic Rendering) + Unit 5 (Data-driven Design & Circularity)

Learning Goals

- Experience 3D garment simulation and AR/VR visualization.
- Practice linking design choices to sustainability metrics (water/CO_2 footprints, fabric waste).

Preparation for Trainers

- Prepare a PPT introducing:
  - Key 3D tools (CLO 3D, Browzwear, Marvelous Designer).
  - Higg MSI and Digital Product Passport concepts.
- Provide 1-2 laptops with CLO 3D (trial) or a similar demo installed.
- Prepare printed cards listing different fabrics (e.g., organic cotton, recycled polyester) with typical environmental footprints.

Description

1. **Introduction (15 min)**
   Recap how 3D garment simulation reduces sampling and waste.

2. **Hands-on Simulation (45 min)**
   - Divide class into groups of 3-4.
   - Each group selects a basic garment template (e.g., T-shirt, dress) and experiments with fabric physics, fit on different avatars, and rendering options.
3. **Sustainability Mapping (30 min)**
   - Each group records material choice and uses provided footprint cards or Higg MSI online calculator to estimate water/CO_2 savings compared to a conventional option.
4. **Show & Discuss (30 min)**
   - Groups present their final 3D garment (screenshot or live on screen).
   - Discuss: How did data-driven choices affect design, cost, and environmental impact?

Trainer Tips

- Prepare a **score sheet** with categories: Design creativity, Accuracy of fit, Sustainability gain.
- Encourage learners to "pitch" their garment as if to a buyer concerned with circularity and EU Digital Product Passport compliance.

Suggested Materials for Trainers

- **PowerPoint slides** (SiT template) with:
  - Key workflow diagrams from the eLearning content.
  - Infographics (e.g., Digital Design Process, Data-Driven Design) already created.

- **Worksheets & Templates**:
  - Tech-pack skeleton.
  - Fabric/environmental impact cards.
  - Group assignment sheets with instructions and timing.

- **Hardware/Software (optional)**:
  - Laptops with CLO 3D trial or other 3D CAD software.
  - Access to Higg MSI or other free LCA calculators.

Learning Outcomes:

By the end of these sessions, learners will:

- Apply the theory hands-on, from concept to digital prototype.
- Quantify sustainability impact using real data and circularity tools.
- Gain teamwork and problem-solving experience relevant to real fashion design studios and manufacturing floors.

2.8. Module 8 - Adaptability, communication skills and creative thinking in fashion industry

Activity 1: Trend Sprint & Communication Pitch

Objective: Practice responding quickly to fashion trends and tailoring communication to different stakeholders.

Instructions:

1. **Trend Briefing (15 min):** Trainer presents a surprise *micro-trend* (e.g., digital fashion, upcycled denim, new color palette, viral TikTok aesthetic).
2. **Team Work (45 min):** Learners split into groups. Each group must:
    - Design a *mini collection concept* (2–3 pieces or visuals).
    - Prepare two communication versions:
        - A **technical presentation** for production/manufacturing partners.
        - A **consumer-facing pitch** (storytelling, visuals, slogans).
3. **Pitch Presentations (30 min):** Each group presents their two communication versions.
4. **Feedback & Reflection (30 min):** Trainer and peers give feedback on creativity, clarity, adaptability, and stakeholder alignment.

Learning Outcomes:

- Responding to fast-changing fashion trends.
- Tailoring communication style (technical vs. inspirational).
- Developing adaptability and quick creative decision-making.

Activity 2: Agile Creative Challenge

Objective: Experience agile project methods while integrating creativity, sustainability, and inclusivity in TCLF.

Instructions:

1. **Challenge Setup (10 min):** Trainer assigns a design/communication challenge, e.g., "Create a campaign for a sustainable capsule collection using agile methods."

2. **Agile Rounds (60 min):**
    - Work in small "scrum teams."
    - Round 1 (15 min): brainstorm ideas → create *initial backlog*.

- Round 2 (15 min): develop visuals/storyboards → sprint review.
- Round 3 (15 min): integrate sustainability & inclusivity → sprint retro.
- Round 4 (15 min): finalize prototype campaign.

3. **Gallery Walk (20 min):** Teams present their campaign prototypes.
4. **Agile Debrief (30 min):** Discuss how agile helped (or hindered) adaptability vs. traditional "big plan upfront" approaches.


Learning Outcomes:

- Applying agile values (iteration, flexibility, collaboration).
- Integrating sustainability, inclusivity, and technology into creative processes.
- Strengthening team communication and adaptability.

3. Recycling Manager

3.1. Module 1 - Sustainability and Circular Economy in Textile/Fashion Industry – an Overview

Activity 1: Workshop 1 - Defining a sustainable product in TCLF

Objective: To build participants' knowledge and practical skills in understanding, analyzing, and applying sustainability principles within the TCLF (Textile, Clothing, Leather, and Footwear) sectors by moving from awareness (sustainability concepts) to practice (product analysis and design).

Panel 1: Sustainability overview in TCLF

- Short presentation: Environmental, social, and economic impacts of TCLF products.
- Highlight key sustainability concepts: eco-friendly materials, ethical labor, circular economy, and transparency.
- Outcome: Ensure all participants share a baseline understanding.

Panel 2: Group exercise: sustainable product analysis

- Participants are divided into small groups (3–5).
- Each group selects a common TCLF product (e.g., t-shirt, sneakers, leather bag).
- Task: Evaluate its sustainability using a checklist (materials, production, labor, transport, end-of-life).
- Outcome: Identify environmental and social hotspots and areas for improvement.

Panel 3: Defining criteria for a sustainable product

- Interactive session: Participants brainstorm what makes a product "sustainable."
- Create a shared list of sustainability criteria for TCLF products (materials, durability, recyclability, fair labor, carbon footprint).
- Outcome: Develop a clear definition and measurable criteria for sustainable TCLF products.

Panel 4: Ideation: Designing a sustainable product

- Individually or in pairs, participants propose a concept for a sustainable TCLF product using the criteria developed.
- Focus on materials, lifecycle, production methods, and social responsibility.
- Outcome: Generate practical, innovative ideas for sustainable product design.

Wrap-Up & Reflection

- Groups share key insights or product concepts.
- The facilitator summarizes learning points: importance of materials, production, transparency, and circularity.

- Outcome: Participants leave with actionable knowledge to define and design sustainable products.

Activity 2: Workshop 2: Positioning a sustainable product on the TCLF value chain globally

Outcome: Establish baseline understanding of value chain concepts.

Panel 1: Overview of the global TCLF value chain
- Presentation covering: Key stages: raw materials, manufacturing, transport, retail, consumption, end-of-life. (Materials can be sourced from *Module 1 U1 -presentation*.)
- Geographical distribution of production vs. consumption.
- Environmental and social hotspots (water use, emissions, labor conditions).
- **Outcome:** Participants recognize where sustainability challenges are most significant.

Panel 2: Mapping exercise: product journey
- Divide participants into small groups.
- Each group selects a TCLF product (e.g., jeans, shoes, jacket).
- Map the product's global value chain from raw materials to end-of-life.
- Identify key environmental/social risks and opportunities for improvement.

Outcome: Visual understanding of global production flow and sustainability pressures.

Panel 3: Positioning for sustainability
Interactive session: Discuss strategies to enhance sustainability at each stage of the value chain.
Consider:
- Sourcing eco-friendly materials
- Ethical manufacturing
- Low-impact logistics
- Consumer engagement for recycling/upcycling

Outcome: Participants learn how to strategically position a product to maximize sustainability.

Panel 4: Group activity: Sustainable value chain proposal
- Each group proposes a plan to improve the sustainability of their chosen product along the value chain.
- Focus on actionable steps at multiple stages (e.g., material sourcing, production, distribution, disposal).

Outcome: Concrete ideas for sustainable product positioning in global supply chains.

Wrap-Up & Reflection
- Groups share key insights and strategies.

Facilitator summarizes best practices and key considerations for sustainable value chain positioning.
Outcome: Participants leave with knowledge of global value chains and practical approaches to enhance product sustainability.

Activity 3: Circular design challenge

Objective: To apply eco-design principles and circular economy strategies in a hands-on product development simulation.

1. Divide learners into small groups. Each group receives a fictional brief: design a sustainable fashion item (e.g. a jacket or bag) using recycled or eco-friendly materials.
2. Groups must consider lifecycle extension, recyclability, ethical sourcing, and minimal environmental impact.
3. Each team sketches their concept and outlines key sustainability features.
4. Presentations follow, with peer feedback focused on circularity and innovation.

Trainer guidance:

- Encourage learners to think beyond aesthetics: focus on materials, production methods, and end-of-life strategies.
- Prompt reflection: “How does your design reduce waste and promote reuse?”

Materials::

- Design brief cards
- Sketch paper or tablets
- Sustainability checklist (e.g. recyclability, ethical sourcing, energy use)

3.2. Module 2 - Management of Recycling Process Regulatory Compliance

Activity 1: Regulation mapping and case comparison

Objective:

Develop the ability to interpret EU environmental legislation and compare how different Member States implement it in the TCLF sector. Can be applied to partner consortium or EU in general.

Steps how to organise the activity:

1. **Case Setup (15 min):** Trainer divides class into small groups. Each group receives a *case file* describing how a TCLF company operates in two different EU countries (e.g., France vs. Italy, Germany vs. Spain). Each file highlights specific regulatory obligations (e.g., EPR schemes, textile waste reporting requirements, circular textiles strategy).
2. **Group Analysis (45 min):** Groups identify:
    - Which EU directives are relevant.
    - How the directives are transposed differently into national law.
    - What compliance challenges the company faces in each country.
    - Risks of non-compliance (financial, legal, reputational).
3. **Presentations & Discussion (30 min):** Each group presents their findings and recommendations.
4. **Wrap-up (15 min):** Trainer summarises key patterns and pitfalls across jurisdictions.

Learning Outcomes:

- Understanding EU vs. national frameworks.
- Assessing compliance requirements.
- Building skills in comparative legal analysis.

Activity 2: Compliance simulation: internal audit and supplier check

Objective:
Practice implementing compliance mechanisms within an organisation and along the supply chain.

1. **Scenario briefing (10 min):** Trainer sets up a fictional TCLF company with end-of-life responsibilities (e.g., mid-sized textile brand exporting to multiple markets). Some suppliers may be compliant, others not.
2. **Roles (10 min):** Learners are split into roles:
    - *Internal auditors* (company compliance team)
    - *Department managers* (design, production, logistics)
    - *Suppliers/subcontractors* (different compliance records, some good, some problematic).
3. **Simulation (45 min):**
    - Auditors conduct *internal audits* (EMS + regulatory compliance).
    - Interview suppliers about documentation, reporting, and practices.
    - Identify risks (greenwashing, missing traceability, non-compliance with EPR).
4. **Reporting & Debrief (30 min):** Auditors present findings, company managers discuss corrective actions, and trainer facilitates reflection on how to strengthen compliance systems.

Learning Outcomes:

- Applying regulatory knowledge in real scenarios.
- Practicing EMS integration and internal audit methods.
- Enhancing awareness of supply chain compliance risks.

3.3. Module 3 - Closed-loop concept in Textile/Fashion Production

Activity 1: Recap & Interactive Mapping – "What makes a loop truly closed?"

Objective: Reinforce key concepts through collaborative visualisation and reflection.

Instructions::

- **Recap quiz or visual brainstorm**:
  Short interactive recap using Kahoot / printed quiz / whiteboard brainstorm. Key terms: closed loop, downcycling, mono-materials, collection systems, EPR, etc.
- **Mapping exercise (group work)**:
  In small groups (3–5 learners), draw a *simplified closed loop textile system*. Identify weak points or missing links (e.g., materials not recyclable, no take-back, poor consumer info).

Trainer guidance:

- Use 4–6 prepared "closed loop confusion cards" (e.g., "Blended t-shirt with PVC print", "Recyclable jeans with glued labels", etc.) to challenge the groups.
- Invite them to reflect: *What's needed to close the loop here?* Is it tech, policy, behaviour, infra?

Materials:

- PowerPoint summary slides (SiT template)
- Printed key term flashcards / closed-loop confusion cards
- Whiteboards or A3 paper, coloured pens

Learning Outcomes:

- Recall and define key concepts related to closed-loop systems (e.g., downcycling, mono-materials, collection systems, EPR).
- Analyse textile product life cycles to identify weak points or missing links in closed-loop systems.
- Propose potential solutions (technological, policy, behavioural, infrastructural) to strengthen closed-loop practices.

Activity 2: Mini Role-Play – "The case of the missing loop"

Objective: understand systemic barriers through stakeholder interaction.

Instructions:

- **Scenario -** Each group receives a scenario where the closed loop *fails* (e.g., local sorting centre can't accept garments due to trims, brand unwilling to fund take-back scheme).
- **Roles assigned**: designer, recycler, municipality rep, marketing lead, consumer.
- In groups, learners role-play a short stakeholder meeting to solve the blockage.
- End with a 1-minute "press conference" per group sharing their proposed fix.

Trainer guidance:

- Encourage empathy for each role. Remind that success in circular systems requires cooperation.
- After role-play, do a short debrief: What compromises were made? What worked?

Materials:

- PPT with case context
- Role cards (brief 1-pagers with goals & limits)
- Timer to keep the pace
- Flipchart to summarise key takeaways

Learning Outcomes:

- Demonstrate understanding of the roles and perspectives of different stakeholders in the textile circular economy.
- Collaborate in a role-play scenario to address systemic barriers in closing the loop.
- Communicate proposed solutions clearly through a simulated stakeholder "press conference."

Activity 2: Closed loop canvas: design your own circular system

Objective: synthesise knowledge by designing a simplified circular business model.

Instructions:

- Teams receive a blank "closed loop canvas":
  - Product concept (e.g., socks, sportswear, uniforms)
  - Material choices
  - Collection method
  - Sorting and recycling pathway
  - Business model (rental, resale, take-back)
  - Challenges + enablers
- Teams fill out their canvas and prepare a 3-min pitch.

Trainer guidance:

- Walk between teams and ask: Who pays for collection? Can these materials be recycled locally? How will consumers return the product?
- In the wrap-up, highlight common patterns: were mono-materials chosen? Was consumer trust addressed?

Materials:

- A3 Closed Loop Canvas template (customisable for learners)
- PPT slide introducing the activity + success criteria
- Timer for team work and pitches

Learning Outcomes:

- Apply circular economy principles to design a simplified business model for a textile product.
- Evaluate the feasibility of material choices, collection methods, and recycling pathways.
- Present and justify a circular business model concept that balances environmental, economic, and social considerations.

3.4. Module 4 -Textile Recycling Technologies and Supply Chain Management

Activity 1: Reverse Logistics Mapping – From Waste to Resource

Learning units addressed: Unit 1: Textile Recycling Technologies and Material Science and Unit 2: Sustainable Supply Chain Management and Transparency

Objective: To visualize and analyse the reverse logistics flow of textile waste, identifying key decision points, sustainability challenges, and opportunities for innovation.

Description:

- Present learners with a fictional textile company aiming to implement a circular recycling model.
- In small groups, learners map the reverse logistics process: collection, sorting, processing, redistribution.
- Each group identifies technologies used (e.g., Radio Frequency Identification, chemical recycling), stakeholder roles, and sustainability risks.
- Groups present their logistics maps and suggest one improvement for transparency or efficiency

Trainer guidance:

- Encourage learners to think critically about traceability, material recovery, and stakeholder coordination.
- Prompt reflection: “Where does transparency break down in textile recycling—and how can we fix it?

Materials: Printed or digital supply chain map template

Supply Chain Map Template: Circular Recycling Model

Fill in each stage of the reverse logistics process with key information:
- Technologies used
- Stakeholder roles
- Sustainability risks

Collection	Sorting	Processing	Redistribution
(Technologies, stakeholders, risks)	(Technologies, stakeholders, risks)	(Technologies, stakeholders, risks)	(Technologies, stakeholders, risks)

Learning Outcomes:
Identify relevant technologies, stakeholder roles, and sustainability risks at each stage.

Analyze transparency gaps and decision points in recycling processes.

Map and present a reverse logistics flow for textile waste.

Activity 2: Stakeholder Role-Play – Managing the Recycling Ecosystem

Learning units addressed: Unit 2: Supplier Engagement and Auditing, Unit 3: The Recycling Manager as a Systems Orchestrator

Objective: To practice stakeholder communication and ethical decision-making in a recycling supply chain context.

Description:

- **Scenario -** Learners form groups of four and receive a short scenario (e.g., supplier fails to meet sustainability standards).
- **Roles -** One learner role-plays the Recycling Manager leading a stakeholder meeting.
- Others act as supplier, auditor, and sustainability officer with differing perspectives.
- After the role-play, the group discusses the manager's approach and suggests alternative strategies.

Trainer guidance:

- Frame the discussion around ethical leadership, negotiation, and system-wide thinking.
- Guide debriefing: "How do we balance sustainability goals with operational realities?"

Materials:

- Scenario cards with stakeholder profiles
- Feedback reflection sheet (focused on communication, ethics, and coordination

Possible training materials package (for trainers):

- PowerPoint slides introducing key concepts from Module 4
- Visuals: recycling process diagrams, reverse logistics flowcharts
- Practical tools: stakeholder mapping templates, traceability checklists
- Suggested reading/media: short case studies on textile recycling innovations

Learning Outcomes:
Reflect on the balance between sustainability goals and operational realities.
Propose alternative strategies for managing stakeholder conflicts.
Practice leadership and coordination skills in the role of a Recycling Manager.

3.5. Module 5 - Environmental Regulations and Chemical Safety Standards in Textile Processes

Activity 1: Chemical safety simulation

Objective: Practice interpreting Safety Data Sheets (SDS), identifying hazards, and applying safe handling procedures with PPE.

Description:

1. **SDS Case Distribution (10 min):** Each group gets a sample Safety Data Sheet for a common textile chemical (e.g., dye, finishing agent, solvent).
2. **Group Analysis (20 min):** Learners identify:
    - Hazard classifications (GHS pictograms, signal words).
    - Storage requirements.

- Emergency measures.
- Required PPE.

3. **Roles play Simulation (30 min):**
   - Learners demonstrate safe handling (using PPE props such as gloves, goggles, lab coats).
   - Trainer sets up a mock *chemical spill scenario* → groups must respond using SDS emergency guidance.
4. **Reflection & Feedback (20 min):** Discussion on good practices, mistakes, and links to real-world textile facilities.

Learning Outcomes:

Interpret Safety Data Sheets (SDS) to identify chemical hazards, storage requirements, emergency measures, and required PPE.

Apply safe handling procedures for textile chemicals using appropriate PPE.
Respond effectively to simulated chemical spills or emergencies following SDS guidance.

Activity 2: Regulation-to-Factory compliance workshop

Objective: Connect abstract regulations (REACH, ZDHC, OEKO-TEX, GOTS) with concrete industry compliance practices.

Description:

1. **Group Assignment (10 min):** Each group is assigned one framework/regulation (e.g., REACH, ZDHC, OEKO-TEX, GOTS).
2. **Mini Research & Mapping (25 min):** Groups answer:
   - What does the regulation/certification require?
   - Which textile processes are affected?
   - What evidence/documentation does a factory need for compliance?
3. **Factory Scenario (20 min):** Trainer presents a fictional textile factory case (e.g., denim finishing plant with pollution and worker safety issues). Each group must propose compliance steps based on *their assigned framework*.
4. **Presentations & Comparison (25 min):** Groups present how *their standard/regulation* would apply to the factory case. Trainer helps identify overlaps, contradictions, and synergies.

Learning Outcomes:

Understand the key requirements of major textile regulations and certifications (REACH, ZDHC, OEKO-TEX, GOTS).

Map regulations to specific textile processes and identify necessary compliance evidence. Apply regulatory requirements to a fictional factory scenario, proposing practical compliance steps.

3.6. Module 6 - Environmental Impact and Carbon Footprint of the TCLF industry

Activity 1: Materials and Design for Recycling Workshop

Objective: Apply eco-design principles to improve recyclability and understand material challenges in real textile products.

Description:

- Presentation on eco-design, using real-life case examples.
- Group exercise: Analyze physical garment samples or printed product images. Identify problematic design features (blends, trims, coatings) and propose solutions (mono-materials, detachable parts, etc.).
- Each group presents its redesign proposals.
- Trainer-led debrief summarizing practical recommendations for working with designers and brands.

Instructions:

1. **Scenario -** Learners form groups of four and receive a short case scenario (e.g. introducing a new recycled textile process with team resistance).
2. **Roles -** One person role-plays the Recycling Manager leading a team meeting. The others act as team members (e.g. sceptical technician, disengaged operator, new sustainability intern).
3. After the role-play, the group gives constructive feedback based on leadership behaviours observed.

Trainer guidance:

- Divide participants into small groups (4–6 people each). Distribute physical garment samples (if available) or printed product images with material composition details.
- Invite each group to present their redesign proposals to the larger group. Encourage them to use flip charts or visuals.
- Summarize key takeaways from the group work. Highlight common design barriers, creative solutions proposed, and best practices for working with designers and brands to improve recyclability.
- Encourage participants to think from a practical business perspective: what solutions are realistic and scalable?
- Facilitate equal participation; ensure quieter participants are encouraged to share ideas.
- Reinforce the connection between product design and downstream sorting and recycling challenges.
- Document key redesign ideas on a flip chart to display throughout the rest of the session as a visual reference.

Materials for Trainers:

- PPT presentation slides (SiT template) on eco-design principles and real examples
- Physical garment samples (e.g., T-shirts, jackets, pants) or high-quality printed images with labeled materials
- Worksheets or redesign analysis templates
- Flip charts and markers
- Sticky notes (optional for quick brainstorming)


Learning Outcomes:

- Participants will gain a hands-on understanding of design barriers to recycling.
- Participants will develop practical redesign ideas they can discuss with brands and designers.
- Increased confidence in identifying and explaining eco-design opportunities in real-world contexts.

Activity 2: Stakeholder Role-Play — Building a Circular Strategy

Objective: Enhance participants' communication, negotiation, and strategic planning skills by simulating real-world discussions among different stakeholders in the textile value chain. Strengthen their ability to align diverse interests to build effective, circular textile solutions

Description:

1. **Roles assignment and introduction -** Participants receive role descriptions (e.g., recycling manager, brand designer, policy maker, consumer advocate, investor). Each role has its own priorities and challenges.

2. **Preparation phase.** Groups define their objectives, negotiation points, and potential compromises. They strategize internally before entering the simulated meeting.

3. **Role-play negotiation.** Groups simulate a roundtable negotiation, working together to develop a shared action plan for launching a circular textile collection and recycling program.

4. **Group presentations.** Each group presents their final agreed strategy to the entire class.

5. **Trainer-led debrief.** Trainer facilitates a discussion on what worked, what challenges arose, and how these lessons can be applied to real industry collaborations.

Instructions for trainers:

Start with a short presentation (10 minutes) introducing the context: "Your mission is to collaboratively design a circular textile collection and recycling program that balances economic, environmental, and social goals."

Assign participants their roles and distribute printed role cards (5 minutes).

Instruct groups to discuss internally and define their priorities, strategies, and potential trade-offs (25 minutes).

Facilitate the main role-play negotiation session (45 minutes). Groups come together to discuss and develop a unified action plan.

Invite groups to present their agreed strategies to the class (20 minutes).

Lead a debrief discussion (15 minutes), encouraging participants to reflect on:

- What challenges did they face in aligning interests?
- What compromises were necessary?
- How can these skills be applied in their real work?

Materials for Trainers:

- PPT slides (SiT template) introducing the activity and summarizing stakeholder roles.
- Printed scenario cards describing each stakeholder's interests, goals, and concerns.
- Flip charts and markers for groups to outline their action plans.
- Templates for groups to record key negotiation points and final strategy summaries.

Learning Outcomes:

- Improved understanding of different stakeholder priorities in circular textile systems.
- Enhanced ability to negotiate and build shared strategies in complex, multi-actor settings.
- Increased confidence in facilitating or participating in cross-sector collaborations.
- Practical experience developing strategic action plans for circular initiatives.

Activity 3: Life Cycle Thinking Hackathon- "Innovate for Circular Textiles"

Objective: Help learners develop innovative, practical, and impactful circular strategies for textiles. Strengthen their ability to integrate LCA insights, eco-design, and business innovation into comprehensive solutions, while practicing teamwork and strategic communication.

Introduction & Challenge Brief (30 minutes)

- Trainer introduces the hackathon challenge and objectives.
- Overview of judging criteria: innovation, environmental impact reduction, feasibility, and scalability.
- Presentation of example focus areas to inspire teams (e.g., design improvements, advanced recycling technologies, consumer campaigns, policy collaborations).

Team Formation & Planning (30 minutes)

- Participants are divided into diverse teams (4–6 people per team), mixing operational, design, and strategic expertise.
- Teams define their main focus areas and set initial roles and tasks.

Strategy Development Phase (2.5 hours)

- Teams work intensively to create their innovative circular textile strategy.
- Suggested areas to address:
    - Eco-design guidelines for new products
    - Material choices and innovations
    - Collection and sorting systems
    - Advanced recycling technologies
    - Consumer awareness and behavior change
    - Policy and stakeholder collaboration
- Trainer circulates to support, provide feedback, and challenge teams to think boldly.

Pitch Preparation (30 minutes)

- Teams finalize their presentation (flip charts, posters, slides, or strategy canvas).
- Prepare a clear 7-minute pitch summarizing their strategy, expected impact, and implementation steps.

Pitch Presentations & Feedback (1 hour)

- Each team presents to the full group (7 minutes each).
- Trainers and peers provide feedback on strengths, innovative elements, and potential real-world application.
- Optional: Award informal "prizes" for categories like "Most Innovative," "Best Consumer Strategy," "Most Feasible," etc.

Instructions:

Encourage teams to consider the entire product life cycle (cradle-to-cradle).
Emphasize integrating life cycle assessment insights into every stage of the strategy.
Remind teams to focus not only on technical solutions but also on business models and behavioural changes.

Ask each team to clearly identify which environmental hotspots their strategy addresses and how it reduces impacts.

Trainer guidance:

- Facilitate an open, energetic atmosphere that encourages creativity and collaboration.
- Check in with each team regularly to ensure they remain focused and to push them to dig deeper into LCA data and real-world feasibility.
- During pitches, moderate discussions and encourage constructive feedback from peers.
- Highlight strong points and areas for potential further development after each pitch.

Materials for Trainers:terials:

- PPT slides (SiT template) to introduce the hackathon challenge and explain judging criteria.
- Flip charts, large paper sheets, markers.
- Sticky notes for brainstorming.
- Optional: Pre-prepared strategy canvas templates to guide teams in structuring their ideas.
- Timer or bell for managing pitch timing.

Learning Outcomes:

- Ability to translate life cycle thinking and sustainability concepts into practical, innovative strategies.
- Stronger skills in teamwork, strategic planning, and persuasive communication.
- Increased understanding of how to address key environmental impacts through circular solutions.
- Inspiration and concrete ideas that participants can adapt and apply in their real-world roles as Textile Recycling Managers.

Activity 4: Self-Assessment Exercise: Evaluating Textile Materials for Environmental Impact

Objective:
This exercise presents case studies of different fabrics used in the textile industry. Your task is to assess whether each material is **harmful** or **sustainable** for the environment based on its production, use, and disposal. For each case, consider:

- Resource use (water, energy, chemicals)
- Pollution (microplastics, toxic dyes, waste)
- Biodegradability & recyclability
- Ethical labor practices

Case Study 1: Conventional Cotton vs. Organic Cotton

Material: Conventional Cotton

Key Facts:
- Requires **2,700 liters of water** to produce one T-shirt (WWF).
- Heavy use of **pesticides & synthetic fertilizers**, harming soil and water systems.
- Often involves **exploitative labor practices** in fast fashion supply chains.

Alternative: Organic Cotton
- Grown without synthetic pesticides/fertilizers.
- Uses **less water** (rain-fed in some regions).
- Still requires significant land and water compared to other sustainable fabrics.

Questions:
1. Why is conventional cotton considered harmful to the environment?
2. How does organic cotton improve sustainability?
3. What are the limitations of organic cotton as a sustainable alternative?

Case Study 2: Polyester (Synthetic) vs. Recycled Polyester

Material: Virgin Polyester (Derived from Petroleum)

Key Facts:
- Made from **fossil fuels**, contributing to carbon emissions.
- Sheds **microplastics** when washed, polluting oceans.
- Non-biodegradable; can take **200+ years** to decompose.

Alternative: Recycled Polyester (rPET)

- Made from recycled plastic bottles or textile waste.
- Reduces dependence on crude oil.
- **Still sheds microplastics** and requires energy-intensive recycling processes.

Questions:

1. How does virgin polyester contribute to environmental pollution?
2. Is recycled polyester a truly sustainable solution? Why or why not?
3. What could make polyester fabrics more eco-friendly?

3. 7. Module 7 - Critical Thinking and Problem-solving in Fashion Industry

Critical Thinking & Problem-Solving for Sustainable Fashion & Textiles

1. Introduction

Critical Thinking in Fashion & Recycling is the objective analysis and evaluation of facts and assumptions to form a sound judgment. It helps identify biases, spot knowledge gaps, and assess ethical implications.

2. Critical Thinking Tools

Bloom's Taxonomy

Outlines six levels of cognitive gain: from remembering to creating sustainable innovation. It can be a powerful tool in the fashion industry, supporting the development of skills from basic knowledge to creative innovation.

Socratic Method

A pedagogical approach that encourages deep student engagement through dialogue between teacher and students, aimed at uncovering the underlying beliefs that shape their views and opinions. It encourages open dialogue rather than quick judgment: Ask "why?"

Biases

- **Status quo:** causes many designers, manufacturers, and decision-makers to favour familiar materials and traditional processes simply because they are established and perceived as less risky.
- **Confirmation:** leads stakeholders to selectively interpret or prioritise information that supports their current practices and business models.

- **Optimism:** leads to an underestimation of the urgency, scale, and complexity involved in transitioning to truly sustainable production methods.
- **Recency:** attention is disproportionately focused on short-term, trendy "green" initiatives that may be popular in the media or within consumers, but lack the durability and scalability required for long-term impact.

Activity 1: Workshop on Biases and Decisions

Learning units addressed: Unit 1 (Introduction to Critical Thinking in the Fashion Industry)

Objective: To understand the principles of critical thinking through a practical group activity that helps participants recognise how cognitive biases influence decision-making in the fashion and textile industry. Then, to practice reframing decisions using a structured critical thinking model (Bloom´s Taxonomy).

Description:

1. **Introduction:**

The trainer briefly introduces the task and the key idea of critical thinking through the Biases and Bloom´s Taxonomy.
Participants are then divided into groups of 3-5. Each group receives the case study scenario of a small local fashion retailer, which must decide whether to continue selling polyester T-shirts or explore alternatives such as organic cotton or recycled fibres.

2. **Group Work:**

The task of each group is to analyse the case: "Launch of a new collection: Fast Fashion vs. Sustainable Line" and identify the biases at play. Then, using Bloom´s Taxonomy, to reframe the decision and develop a new decision-making process to support a sustainable approach.
They can prepare a poster with their findings (bias identified, Bloom´s steps applied and new decision process).

3. **Group Presentations:**

Each group presents the key ideas from their solution.

4. **Class Discussion and Feedback:**

The class discusses the idea proposed. The trainer compares the solutions presented and highlights creativity, linking back to real-word industry practices.

Materials:

1. Background Reading for Participants: Critical thinking, Biases and Bloom's Taxonomy (handout of the pyramid for reference).
2. Worksheet for Group Work: Scenario – "Launch of a new collection: Fast Fashion vs. Sustainable Line"
3. Poster paper and Markers.

Learning Outcomes:

Identify cognitive biases (status quo, confirmation, optimism, recency) influencing decision-making in fashion and textile contexts.

Apply Bloom's Taxonomy to reframe decisions and structure a critical thinking process.

Analyze a real-world case scenario to balance fast fashion and sustainable options.

Worksheet for Group Work

Scenario – "Launch of a new collection: Fast Fashion vs. Sustainable Line"

You are a small, local fashion boutique, which sells clothing ranging from designer brands to famous fast-fashion chains.
One of the products you currently sell is polyester-based T-shirts, because they are cheap, easy to source, and quick to produce. However, a supplier has offered organic cotton and recycled fibre alternatives, which are slightly more expensive.
Your management team is unsure whether to switch, fearing higher costs and losing customers.

Your Group Task:

1. Identify the Biases: Which biases might be influencing the retailer´s current decision?

   Write down at least 2 biases you see:

   _____

   _____

   _____

2. Reframe with Bloom´s Taxonomy: Use Bloom´s levels to structure better thinking.

   Utilise and fill in the handout provided:

   _____

3. Propose a New Decision Process: Design a decision-making process that avoids the biases you identified previously.

   Recommendation:

   _____

4. Prepare your Output: Present your answers to the previous points on a poster and present it to the class.

Activity 2: Role-Play on the Socratic Method

Learning units addressed: Unit 1 (Introduction to Critical Thinking in the Fashion Industry)

Objective: To let participants practice Socratic questioning by challenging common assumptions in fashion decision-making. Learners can recognise how everyday choices carry hidden assumptions and negotiate balanced, sustainable decisions through role-play.

Description:

1. Introduction:

The trainer briefly introduces the task and the key idea of critical thinking through the Socratic Method.
The trainer divides the participants in groups of 4-5. Each group is assigned the roles of Designer, Sustainability Manager, Financial Officer and Consumer Representative of a company, with each role arguing for different ideas.

2. Group Work:

The task of each group is to use socratic questioning to challenge the assumptions of the roles the participants are impersonating. Then, to negotiate and decide which proposal to accept. Participants can prepare a short Poster with their initial assumption, the key socratic questions raised and the final decision with its justification (sustainability logic).

3. Group Presentations:

Each group presents the key ideas from their decision.

4. Class Discussion and Feedback:

The class discusses the decisions taken and their weight on the company. The trainer compares the different ways of questioning presented and highlights respectful debates, linking back to real-word industry practices.

Materials:

- Background Reading for Participants: Brief explanation of the Socratic Method and its employment.
- Role cards (one per role, with position and goal/proposal)
- Poster paper and Markers.

Scenario Example:

The Designer starts with the proposal: “Let´s use polyester.”

- The Designer wants to use polyester as it is cheap.
- The Sustainability Manager argues for eco-materials.
- The Financial Officer is concerned with costs and profit margins.
- The Consumer Representative reflects changing consumer expectations, such as eco-conscious buyers.

Socratic Questions Raised:

- Financial: about cost
- Sustainability: about impact
- Consumer Representation: about consumer reaction
- Designer prompted: successful employment

Role Card Template

- Role
- Your Position
- Your Goal
- Questions to Ask
- Final Decision

Learning Outcomes:
Use Socratic questioning to challenge assumptions in fashion decision-making.
Recognize hidden assumptions in everyday business decisions and their sustainability implications.
Negotiate and make balanced decisions considering multiple perspectives (designer, sustainability manager, financial officer, consumer).

3.8. Module 8 - Leadership and Management in Textile/ Fashion Industry

Activity 1: Leadership across the cycle – scenario mapping exercise

Learning units addressed: Unit 1 (Introduction), Unit 3 (Strategic thinking), Unit 4 (Ethical leadership)

Objective: To analyse how leadership behaviours affect different stages of recycling-oriented textile/fashion operations and explore strategic responses to sustainability dilemmas.

Instructions:

1. Present participants with a fictional mid-sized fashion company introducing a recycling line.
2. In small groups, learners map out key leadership decisions across the product lifecycle (e.g. sourcing, design, team coordination, production, take-back systems).
3. Each group highlights risks, ethical considerations, and areas for improvement.
4. Groups briefly present their leadership roadmaps and reflect on trade-offs.

Trainer guidance:

- Encourage participants to consider the role of managers in enabling circularity.
- Prompt reflection: "Where does ethical leadership make the biggest difference?"

Materials:

- A3 printed lifecycle map template or digital whiteboard
- Sticky notes or digital post-its
- Scenario briefing sheet

Learning Outcomes:
Analyse how leadership decisions affect different stages of recycling-oriented textile/fashion operations.
Identify risks, ethical considerations, and trade-offs in managerial decision-making.
Map strategic leadership interventions to enable circularity across the product lifecycle.

Activity 2: Team leadership for circular change – role-play and feedback

Learning units addressed: Unit 2 (Team leadership), Unit 3 (Performance evaluation), Unit 4 (DEI and ethics)

Objective: To practise inclusive, motivational leadership in the context of green transition challenges.

Instructions:

1. Learners form groups of four and receive a short case scenario (e.g. introducing a new recycled textile process with team resistance).
2. One person role-plays the Recycling Manager leading a team meeting.
   The others act as team members (e.g. sceptical technician, disengaged operator, new sustainability intern).
3. After the role-play, the group gives constructive feedback based on leadership behaviours observed.

Trainer guidance:

- Offer framing: "How can we lead teams through behavioural change without relying on authority alone?"
- Guide debriefing to connect actions to circularity, motivation, and DEI values.

Materials:

- Scenario cards with character profiles
- Feedback reflection sheet (based on inclusion, communication, clarity, empathy)

Learning Outcomes:

Demonstrate inclusive and motivational leadership in the context of green transition challenges.

Apply strategies for leading teams through behavioural change without relying solely on authority.

Observe and provide constructive feedback on leadership behaviours, including communication, empathy, and DEI considerations.

Annex 2:

Collection of methods and activities for the Work Based Learning phase

Co-funded by the European Union

Table of Content

Instructions for Work-Based Learning

Work-based learning allows learners to apply sustainability and management concepts directly within their work environment. The aim is to strengthen practical competence through hands-on activities, critical observation, and reflective evaluation. Training providers are encouraged to use the following tasks, templates, and guidance to support learners and supervisors.

1. Module 0 - Sustainability fundamentals

WBL Task 1: Life-Cycle Assessment: Reducing Environmental Impacts

Relevant to: Unit 2

1. Task Summary

Participants will assess opportunities to reduce the environmental impact of textile production across five life-cycle stages: raw materials, manufacturing, distribution, use, and disposal, using real examples.

2. Instructions for Activity Implementation

Analyze company's existing Life-Cycle Assessment (LCA) model through the lens of sustainability.

3. Key Steps:

1. Describe the current Life-Cycle Assessment (LCA).
2. Identify opportunities for introducing sustainable practices.
3. Assess the advantages and challenges of implementation..

4. Learners' Activities:

1. Collect data on the company's production process and map the life-cycle stages.
2. Identify at least 2–3 areas where environmental impacts can be reduced.
3. Prepare a short report or presentation summarizing findings and proposed improvements.
4. Reflect on barriers (technical, financial, organizational) to implementing changes.

5. Employers' / Supervisors' Activities

1. Provide learners with access to production process data, reports, or sustainability audits.
2. Offer guidance on which life-cycle stages are most relevant for analysis.
3. Validate the learners' findings with real-world business considerations (e.g., cost, supply chain constraints).

4. Give constructive feedback on the proposed improvements and their feasibility.

WBL Task 2: Development and Evaluation of a Business Model for Sustainability: Circular Economy and Slow Fashion

Relevant to: Unit 1 (Sustainable Economic Practices and Resource Management)

1. Task Summary

Participants are required to evaluate a business model that incorporates the principles of the circular economy or slow fashion. This activity is conducted in the workplace, using practical examples from their own organization.

2. Instructions for Activity Implementation

Analyze your company's existing business model through the lens of sustainability.

3. Key Steps:

5. Describe the current business model (e.g., how products are marketed, how waste is managed, what happens to products after use).
6. Identify opportunities for introducing sustainable practices (e.g., material recycling, reuse, rental, repair, second-hand sales, limited collections).
7. Assess the advantages and challenges of implementation (economic, environmental, and social aspects).

4. Learners' Activities

1. Conduct a review of the company's business model using provided templates or tools.
2. Identify 2–3 sustainability-focused innovations that could realistically be piloted.
3. Engage colleagues or customers (e.g., short survey or interviews) to understand acceptance of circular practices.
4. Summarize findings in a business case or proposal, highlighting potential benefits and risks.

5. Employers' / Supervisors' Activities

1. Provide learners with access to relevant business model data (sales, customer feedback, waste figures).
2. Share insights on company priorities and limitations regarding sustainability.
3. Facilitate opportunities for learners to discuss ideas with management or other departments.
4. Review learners' proposals and provide feedback on alignment with company strategy.

2. Bio-Textile Technician

2.1. Module 1 - Bio-based textile material properties and processing techniques

WBL Task 1: Waste analysis in the company

Objective: Encourage companies to reflect on textile waste and recycling potential.

1. Task Summary

Tasks: Learners investigate waste practices in their company, focusing on textile materials, production residues, and disposal methods. The task aims to build awareness of current challenges and opportunities for circularity.

1. **Waste Data Collection:**
    - Record **quantities and types** of textile waste (e.g., natural fibers, synthetic fibers, blended materials, bio-based materials).
    - Identify **sources of waste** (production steps, finishing, packaging, post-use returns).
    - Document **disposal methods** currently in use (landfill, incineration, recycling, composting, reprocessing).

2. **Reflection and analysis:** Use a **reflection sheet** to answer guiding questions:
    - Which materials could be **recycled, reused, or upcycled**?
    - Which residues could be **valorized through bio-based processes** (e.g., composting, fermentation, extraction of natural compounds)?
    - What are the **barriers** to implementing these solutions (technical, economic, logistical)?

3. **Feedback and discussion with supervisors:**
    - Present findings in a short **feedback session**.
    - Develop **practical suggestions** for improving the company's material cycle (e.g., separation of waste streams, collaboration with recyclers, introduction of bio-based recycling options).
    - Reflect on **how bio-textile solutions** (biodegradable materials, bio-composites, or eco-friendly finishing processes) could reduce waste generation.

3. Materials

- Instructional **PPT** (overview of textile waste categories, recycling options, bio-based valorization examples).
- **Data collection template** (tables for quantities, material types, disposal methods).
- **Reflection sheet** ("What could be recycled, reused, or valorized?").

- **Feedback template** (to structure discussion with supervisors).
- **Evaluation sheet** (to assess learner performance and company relevance).

Learning Outcomes:
Identify and document different types, sources, and quantities of textile waste in a workplace context.
Analyze current waste management and disposal practices (landfill, incineration, recycling, composting, reprocessing).
Evaluate opportunities for recycling, reuse, or valorization through bio-based processes (e.g., composting, fermentation, extraction).

WBL Task 2: Material evaluation in the company

Objective: Evaluation and testing of sustainable materials in a business context. Enable learners to evaluate and test the sustainability of textile materials within a real business context, focusing on environmental impact, certification standards, and opportunities for substitution with bio-based alternatives.

1. Task Summary

Learners investigate the materials currently used in the company's products or processes. They analyze environmental performance and certification status and reflect on possible replacements or improvements.

1. **Material evaluation in the company:**
   - Select **2–3 key materials** (e.g., cotton, polyester, viscose, biopolymers, natural fibers).
   - Assess each material according to:
     - **Water consumption** in cultivation/processing.
     - **Carbon footprint** across production and use stages.
     - **Certifications** (e.g., GOTS, OEKO-TEX, Cradle-to-Cradle, FSC, Fair Trade).
     - **End-of-life options** (recyclability, biodegradability, compostability).
   - Compare the performance of conventional vs. bio-based or low-impact alternatives.
2. **Reflection Task:**
   - Use the reflection sheet to answer guiding questions:
     - Which currently used materials show the **highest environmental impact**?
     - Which materials could be **replaced by bio-based or recycled alternatives** in the short term?

- What would be the **potential benefits and challenges** of replacement (cost, availability, performance, customer acceptance)?

3. **Feedback and discussion with supervisors:**
   - Present findings in a **short presentation or discussion session**.
   - Provide **recommendations** for sustainable material substitution (e.g., replacing conventional cotton with organic cotton, petroleum-based polyester with recycled or bio-based polyester).
   - Explore opportunities for **innovation in bio-textiles** (e.g., bacterial cellulose, algae-based fibers, bio-leather).

4. Materials

- Instructional **PPT slide set** with step-by-step instructions and examples of sustainable materials.
- **Evaluation sheet** (structured table for water, carbon footprint, certification, end-of-life options).
- **Reflection sheet** ("Which materials could be replaced by more sustainable alternatives in the short term?").
- **Feedback template** (to structure presentation/discussion with supervisors).
- **Evaluation rubric** (to assess depth of analysis, critical reflection, and practicality of suggestions).

Learning Outcomes:
Evaluate the sustainability of selected textile materials using key criteria (water use, carbon footprint, certifications, end-of-life options).
Compare conventional materials with bio-based or low-impact alternatives in terms of environmental performance.
Identify materials with the highest sustainability risks in the current product range.

WBL Task 3: Mini-project

Objective:
Support learners in applying innovative, sustainable, or bio-based textile materials within a real business context by developing and testing a pilot idea that bridges research and practice.

1. Task Summary

Learners design a small-scale **mini-project** in which they propose, prototype, or test an innovative bio-textile material (e.g., bacterial cellulose, bio-based polyester, algae-based fibers, natural dye alternatives). The aim is to explore how novel materials can be integrated into the company's product line or processes.

1. **Mini-Project: Testing a Pilot Material**
   - Select or be assigned an **innovative sustainable material** relevant to the company.
   - Research the **properties, advantages, and limitations** of this material (e.g., durability, biodegradability, sourcing, scalability).
   - Develop a **proposal** for a product, component, or small collection using the material.
     - Define the **product idea** (e.g., accessory, garment, prototype fabric).
     - Outline the **expected sustainability benefits** compared to conventional options.
     - Consider **production requirements** (machinery, finishing, compatibility with current processes).
2. **Feedback Round with Specialist Departments**
   - Present the mini-project proposal to relevant departments (e.g., R&D, production, design, marketing).
   - Gather structured **feedback on feasibility**, including:
     - **Technical feasibility** (production fit, performance testing).
     - **Economic feasibility** (cost, sourcing, supply chain).
     - **Market feasibility** (customer acceptance, branding, certification potential).

3. **Reflection and documentation**
   - Use a reflection sheet to evaluate the mini-project experience:
     - What worked well?
     - What challenges emerged?
     - How could the idea be further developed or scaled?
   - Suggest **next steps** (e.g., prototype testing, pilot production, customer trial, collaboration with bio-material startups).

4. Materials

- **Project template** (structured outline: material description, product idea, sustainability impact, feasibility considerations).
- **Feedback form** (criteria for departments: technical, economic, market acceptance).
- **Reflection sheet** (guiding questions for learners to critically assess the mini-project).

Learning Outcomes:

Research and critically assess the properties, advantages, and limitations of an innovative bio-textile material.

Apply knowledge of bio-based textile processes to develop a feasible product, component, or collection proposal.

Integrate sustainability considerations into product design (e.g., durability, biodegradability, production compatibility).

2.2. Module 2 - Chemistry for textile processing and dyeing with less environmental impact

WBL task 1: Evaluate environmental performance of dyeing process at your workplace

1. Assignment Steps for Learner

Objective: Assess the sustainability of one existing dyeing process at your workplace by analysing process parameters and identifying opportunities for improvement using green chemistry principles.

Instructions (for employee/learner):

1. Choose one dyeing recipe (synthetic or natural dye) currently used at your workplace.
2. Record the following parameters using the provided Process Audit Template:
   - ✔ Liquor ratio
   - ✔ Temperature & time
   - ✔ Type and amount of chemicals (dye, auxiliaries, salts, alkali)
   - ✔ Water and energy consumption estimate
   - ✔ Wastewater characteristics (if available)
3. Using the 12 Principles of Green Chemistry, identify:
   - ✔ At least three environmental hotspots
   - ✔ Suggest two potential improvements (e.g. switch to HFRD, reduce liquor ratio, replace mordant)
4. Write a short reflection (~300 words):
   - ✔ What surprised you?
   - ✔ Were green alternatives feasible in your context?

a) Included Materials:

- ☐ PPT: Instructions for the assignment (with example)
- ☐ Process Audit Template (Excel or Word)
- ☐ Reflection Template
- ☐ Supervisor Feedback Form with simple criteria: accuracy, practicality, initiative

2. Templates

a) **Process Audit Template:** Sustainable dyeing process evaluation

1. General information

Date: _____
Name of employee: _____

Supervisor: _____
Department: _____

2. Process description

Dyeing process name: _____
Type of dye: _____ (e.g., Reactive, Disperse, Natural)
Fibre type: _____
Machine/Equipment used: _____

3. Process Parameters

Parameter	Value / Description
Liquor ratio	
Dyeing temperature (°C)	
Dyeing duration (minutes)	
Auxiliaries used (type and quantity)	
Amount of salt (g/L)	
Amount of alkali (g/L)	
Water consumption (estimate)	
Energy consumption (estimate)	
Wastewater characteristics (pH, COD, etc.)	

b) Reflection Template: Self-Evaluation

1. What are the key sustainability issues you observed in this process?

2. Which part of the process could be improved using green chemistry principles?

3. Suggest at least two specific improvements and explain why they are relevant?

4. Which challenges or problems did you encounter?

5. Additional comments or questions:

c) Supervisor Feedback Form

Employee Name: _____
Reviewed by: _____
Date: _____

Evaluation Criteria

Criteria	Excellent	Satisfactory	Needs improvements

Understanding of task			
Accuracy of data			
Safe use of equipment			
Practicality of suggestions			
Initiative and engagement			

Additional Comments:

_____

Final assessment:

- ☐ Met requirements
- ☐ Partially met requirements
- ☐ Needs repetition

Supervisor signature: _____

WBL task 2: Assess digital printing setup and recommend improvements

Objective: Analyse the environmental and process aspects of digital textile printing at your workplace, focusing on sustainability and print quality

Instructions (for employee/learner):

1. Observe and document the current digital printing process:
   - ✔ Type of ink used (pigment, reactive, disperse)
   - ✔ Fabric type and pre-treatment/post-treatment steps
   - ✔ Amount of water, chemicals, or energy used (if known or estimated)
   - ✔ Print defects (bleeding, low fixation, rubbing issues)

2. Use the Digital Printing Analysis Template to:
   - ✔ Identify at least two process steps that can be optimized for lower impact
   - ✔ Suggest alternatives (e.g. switch to waterless pigment inks, enzymatic pre-treatment)
3. Discuss your findings with your supervisor using the Evaluation Form provided.
4. Submit a 1-page summary with:
   - ✔ Key observations
   - ✔ Improvement proposal

✔ Supervisor comments

c) Included Materials:
- ✔ PPT: Overview of sustainable digital printing
- ✔ Digital Printing Analysis Template
- ✔ 1-Page Summary Template
- ✔ Supervisor Evaluation Form (incl. rating on insight, relevance, innovation)

Templates

a) Process Audit Template: Digital printing process evaluation

1. General information

Date: _____
Name of employee: _____
Supervisor: _____
Department: _____

2. Digital printing audit form

Parameter	Observation/Notes
Ink type (pigment, reactive, disperse)	
Pre-treatment required (yes/no + type)	
Fabric type and preparation	
Post-treatment (washing, curing, steaming, etc.)	
Water use (estimate or description)	
Observed print quality (e.g. bleeding)	
Waste (ink residue, chemical disposal)	

b) Reflection Template: Self-Evaluation

1. Which challenges or problems did you encounter?
2. What aspects of the digital printing process are most and least sustainable?
3. What surprised you during analyses?
4. Suggest two improvements for the current setup and explain your reasoning.
5. Additional comments or questions:

c) Supervisor Feedback Form

Employee Name: _____
Reviewed by: _____
Date: _____

Evaluation Criteria

Criteria	Excellent	Satisfactory	Needs improvements
Understanding of task			
Accuracy of data			
Safe use of equipment			
Practicality of suggestions			
Initiative and engagement			

Additional Comments:

_____

Final assessment:

- ☐ Met requirements
- ☐ Partially met requirements
- ☐ Needs repetition

Supervisor signature: _____

2.3. Module 3 - Sustainable Production of Textile/ Clothing products

WBL task 1: Integration of traditional textile methods with modern eco-friendly practices and opportunities for optimizing their properties.

1. Task Summary

1. **Assignment Steps for Learner**

a) Exercise in modern textile methods, Use of eco materials for processing and dyeing finished products, Modern eco-friendly practices, Minimizing water and electricity usage Product design

b) **Included Materials:**

- PPT: Instructions for the assignment (with example)
- Small hand looms, knitting hooks, needles for needle felting
- Yarns and fibers with different textures
- Natural dyes and containers for demonstrations
- Examples of finished products (for inspiration)

- **Supervisor Feedback Form** with simple criteria: accuracy, practicality, initiative

2. Templates

a) Process Audit Template: Sustainable dyeing process evaluation

1. **General information**

   Date: .....

   Name of employee: .....

   Supervisor: .....

   Fabric production method: .....

2. **Process description**

   Type of manufacturing method: .....

   Number of fibers used: .....……

   Type of fibers used: .....……

   Obtained product (finished product): .....

3. Process implementation

- Each team member has one of the following roles: design, material preparation, execution, documentation. Implementation steps:
- Discussion and work plan
- Task distribution and action initiation
- Each group presents the created product, describes the techniques used and ecological practices.

b) Reflection Template: Self-Evaluation

1. What are the key sustainability issues you observed in this process?
2. In which part of the manufacturing process can only sustainable materials and techniques be used and when will the process not be fully sustainable?
3. Discussion of mass application or textile optimization.
4. Suggest at least two specific improvements and explain why they are relevant?
5. Which challenges or problems did you encounter?
6. Additional comments or questions:

c) Supervisor Feedback Form

Employee Name: .....

Reviewed by: .....

Date: .....

Evaluation Criteria

Criteria	Excellent	Satisfactory	Needs improvements
Understanding of task			
Used materials			
Used manufacturing techniques			
Used processing techniques			
Team participation, engagement and understanding			

Additional Comments:

.....

Final assessment:

- ☐ Met requirements
- ☐ Partially met requirements
- ☐ Needs repetition

Supervisor signature: .....

WBL task 2: Research and application of testing procedures and quality assurance protocols. Types of testing and purpose.

Objective: Familiarization with material testing procedures and quality assurance protocols.

Instructions (for employee/learner): Review the provided data in the material testing protocol:

• Tensile strength

• Wash fastness

• Light fastness

1. Based on the data from the testing protocol, complete the quality assessment form: • Track the data and make an assessment for each material • Compare reference values and make an overall conclusion
2. Discuss your findings with your supervisor using the Evaluation Form provided.
3. Submit a 1-page summary with: • Key observations • Improvement proposal • Supervisor comments

Included Materials:

• PPT: comparative tables and charts
• 1-Page Summary Template
• Supervisor Evaluation Form (incl. rating on insight, relevance, innovation)

2. Templates

a) Process Audit Template: Research and application of testing procedures and quality assurance protocols.

1. General information

   Date: .....
   Name of employee: .....
   Supervisor: .....
   Department: .....

2. Digital printing – types of fabrics

Parameter	Observation/Notes
Tensile strength	
Wash fastness	
Light fastness	
Shrinkage	
Change in absorbed water	
Included impurities	

a) **Reflection Template**: Self-Evaluation

1. Which of the investigated bio-fibers have the best qualities?
2. Are there other fibers that can improve their qualities through the addition of additives?

3. Are there other bio-fibers that can improve their qualities through additional processing?
4. Suggest options for improving the qualities of specific bio-fibers.
5. Additional comments or questions:

Supervisor Feedback Form

Employee Name: .....
Reviewed by: .....
Date: .....

Evaluation Criteria

Criteria	Excellent	Satisfactory	Needs improvements
Understanding of task			
Accuracy of data			
Safe use of equipment			
Practicality of suggestions			
Initiative and engagement			

Additional Comments:

_____

Final assessment:

- ☐ Met requirements
- ☐ Partially met requirements
- ☐ Needs repetition

Supervisor signature: _____

2.4. Module 4 - Sustainable sourcing and supply chain for bio-based textile materials

WBL Task 1 – Quality Systems in Bio-Textile Supply Chains

Description

1. Case Study Analysis (30 min)

- Analyze real **quality failure case studies** (based on anonymized GOTS audit reports).
- Apply **fishbone diagrams** and **5-Why methodology** to identify root causes.
- Develop **corrective action ideas** through problem-solving.

2. Mock Audit Simulation (40 min)

- Teams represent different supply chain roles (supplier, logistics provider, manufacturer, auditor).
- Implement **Three-Tier Verification protocols** on actual bio-material samples.
- Use professional testing equipment (**pH meters, moisture analyzers, digital microscopes**).
- Record results with correct **documentation protocols**.

3. Stakeholder Negotiation Simulation (30 min)

- Role-play a dispute over quality degradation or certification discrepancies.
- Students act as **supplier reps, customer quality managers, auditors**.
- Negotiate solutions using **corrective action planning frameworks**

4. Digital Quality Management Integration (20 min)

- Create a sample **Corrective and Preventive Action (CAPA) plan**.

Materials

- Case study handouts (based on authentic audit reports)
- Fishbone diagram & 5-Why templates
  Bio-material samples (cotton, hemp, mycelium leather, natural dyes)
- Testing equipment: pH meters, moisture analyzers, microscopes
- Role-play scenario cards (certification disputes, claims, audit findings)
- CAPA templates

Learning Outcomes

- Apply root cause analysis tools (fishbone, 5-Why) to real quality failures.
- Implement practical verification protocols for bio-material quality assessment.

- Operate basic quality testing equipment and record data correctly.
- Simulate audit and negotiation processes between supply chain stakeholders.

WBL Task 2: Industry Immersion Project – Real Supply Chain Analysis (4 Hours / Multi-Week)

Description

Week 1–2: Partner Matching & Project Scoping

- Students matched with **industry partners** (organic cotton suppliers, brands, logistics providers, certification bodies).
- Sign **learning agreements** covering project scope, deliverables, confidentiality, and mentorship.

Week 3–4: Field Research & Data Collection

- On-site visits or virtual shadowing at partner facilities.
- Activities: observe supplier negotiations, QC procedures, sustainability audits.
- Keep **reflective journals** documenting observations, challenges, and theory-practice links.

Week 5–6: Analysis & Solution Development

    - Market assessment (Unit 1)
    - Logistics optimization (Unit 2)
    - Quality management principles (Unit 3)
- Work with mentors to design practical recommendations.
- Use **industry-standard tools** (Oracle TMS, sustainability platforms).

Week 7–8: Professional Presentation & Implementation

- Present findings to **senior management teams**.
- Structure presentations using **business case format** (executive summary, financials, risks, implementation timeline).
- Receive feedback and coaching from industry mentors.

Materials

- Learning agreement templates
- Industry partner project briefs
- Reflective learning journal template
- Access to professional databases/software (Oracle TMS, sustainability reporting tools)

- Business case presentation template
- Mentor evaluation forms

Learning Outcomes

- Conduct authentic supply chain assessments for real companies.
- Apply classroom learning to professional challenges in sourcing, logistics, and quality management.
- Analyze and propose solutions to **live organizational problems**.
- Document observations and insights in reflective journals that connect theory to practice.
- Use professional supply chain management and quality systems software.

2.5. Module 5 - Basic principles of biotechnology and bioengineering for bio-based textile materials

WBL Task 1: Mapping Biotechnology in the Workplace

Relevant to: Unit 1 (Introduction to Biotechnology and Bioengineering in the Textile Sector) and Unit 2 (Biofabrication and the Use of Microorganisms).

Objective: To identify and analyze real-life applications of biotechnology and biofabrication processes in the learner's workplace or a partner company, fostering awareness of sustainable practices and innovation potential.

Instructions for learner:

Identify a process, product, or material in your workplace (or a partner company) that involves biotechnology or biofabrication.

Observe and document how enzymes, microorganisms, or biomaterials are used in this context.

Use an observation template to record key information: type of technology, purpose, sustainability benefits, and challenges.

Interview a technician or supervisor (if possible) to gain deeper insights into the process.

Reflect on how this application aligns with what you learned in Units 1 and 2.

Submit your completed observation and a short reflection (300–500 words) on the relevance and potential of biotechnology in your workplace.

Deliverable:

Completed observation template with detailed notes on the biotechnological or biofabrication process observed.

Short written reflection (300–500 words) on the relevance and potential of biotechnology in the learner's workplace.

Trainer guidelines:

Brief learners on the key concepts from Units 1 and 2 before the activity.

Ensure learners have access to a relevant workplace or simulated environment.

Provide the observation template and support learners in identifying suitable processes to observe.

Encourage learners to engage with technicians or supervisors for deeper understanding.

Review the submitted reflections and provide formative feedback, focusing on the learner's ability to connect theory with practice.

WBL Task 2: Designing a Bio-Based Textile Prototype

Relevant to: Unit 2 (Biofabrication and the Use of Microorganisms) and Unit 3 (Nanotechnology Applied to Bio-Based Textiles).

Objective: To collaboratively design a prototype of a textile product using bio-based materials and/or nanotechnology, applying knowledge of microorganisms, biofabrication techniques, and functional enhancements.

Instructions for learner:

Form a small team (2–4 learners) or work individually to design a prototype of a textile product using bio-based materials and/or nanotechnology.
Choose one or more techniques from Unit 2 (e.g., fermentation, bioprinting) and one enhancement from Unit 3 (e.g., antimicrobial properties).
Use a design document to outline your concept: materials, process, expected properties, and sustainability impact.
If possible, consult with a supervisor or technician to validate the feasibility of your design.

Present your prototype concept in a short pitch (oral or written) and submit the completed design template.
Include a reflection on the challenges of integrating biotechnology and nanotechnology in textile design.

Deliverable:

Completed design template describing the prototype: materials, processes, expected properties, and sustainability benefits.

Optional: visual sketch or digital mock-up of the prototype.

Short reflection on the challenges and opportunities of integrating biotechnology and nanotechnology in textile design.

Trainer guidelines:

Facilitate group formation or support individual learners in selecting a focus for their prototype.

Review key content from Units 2 and 3, especially biofabrication techniques and nanotechnology applications.

Provide the design template and examples of innovative bio-based textiles.

Encourage creativity while ensuring technical feasibility.

Offer feedback on the design concept and guide learners in refining their ideas.

WBL Task 3: Sustainability Audit and Innovation Proposal

Relevant to: Unit 1 (Introduction to Biotechnology and Bioengineering in the Textile Sector) and Unit 3 (Nanotechnology Applied to Bio-Based Textiles).

Objective: To conduct a sustainability audit of a textile process or product and propose a biotechnological or nanotechnological innovation to improve its environmental performance.

Instructions for learner:

Select a textile product or process currently used in your workplace.
Conduct a basic sustainability audit using a checklist (e.g., energy use, waste generation, chemical inputs).
Based on your findings, propose a biotechnological or nanotechnological innovation to improve sustainability.

Use a document to describe your idea: current situation, proposed change, expected benefits, and potential barriers.
Discuss your proposal with a supervisor or mentor and request feedback using the feedback form.

Submit the completed audit checklist, innovation proposal, and a short reflection on the feasibility and impact of your idea.

Deliverable:

Completed sustainability audit checklist.

Innovation proposal (1–2 pages) outlining the current situation, proposed biotechnological/nanotechnological improvement, expected benefits, and potential barriers.

Supervisor feedback form (if applicable).

Short reflection on the feasibility and impact of the proposed innovation.

Trainer guidelines:

Introduce learners to basic sustainability assessment tools and indicators.

Provide the audit checklist and proposal template.

Support learners in selecting a suitable process or product to audit.

Encourage consultation with workplace supervisors or mentors.

Review proposals for clarity, innovation, and alignment with sustainability goals.

Use the supervisor feedback form to gather external input and validate learner insights.

Learning Outcomes:

Completion of these work-based learning activities will enable participants to apply theoretical knowledge in real-world textile production and innovation contexts, deepening their understanding of sustainable biotechnological and nanotechnological practices.

Through hands-on assignments, learners will strengthen their ability to identify opportunities for integrating microorganisms, bio-based materials, and nanostructures into textile processes. They will also develop practical solutions to improve environmental performance, material efficiency, and product functionality.

Participants will enhance their capacity to collaborate with colleagues and supervisors, communicate technical ideas effectively, and contribute to a culture of innovation and sustainability within their organizations.

These activities also encourage learners to critically assess current practices, propose feasible improvements, and reflect on the broader implications of biotechnology and nanotechnology in the circular textile economy.

Overall, learners will develop key transversal skills such as critical thinking, problem-solving, and applied research, resulting in tangible contributions to workplace innovation and sustainability goals.

<u>Optional templates for training providers:</u>
Activity 1: Mapping Biotechnology in the Workplace

- Template 1: Observation Template
- Template 2: Reflection Template
- Template 3: Supervisor Feedback Form

Activity 2: Designing a Bio-Based Textile Prototype

- Template 1: Prototype Design Template
- Template 2: Reflection Template
- Template 3: Supervisor Feedback Form

Activity 3: Sustainability Audit and Innovation Proposal

- Template 1: Sustainability Audit Checklist
- Template 2: Innovation Proposal Template
- Template 3: Reflection Template
- Template 4: Supervisor Feedback Form

2.6. Module 6 - Quality Control and testing methods for bio-based textile products

WBL task: Laboratory Testing of Bio-Based Textile Properties

Assignment Steps for Learner

A. Sample Preparation and Conditioning

- Select a batch of textile material (e.g., organic cotton or bio-based fibers) with your supervisor.
- Cut representative samples as per relevant standards, labeling each sample.
- Condition all samples in a standard atmosphere (according to ISO 139: conditions RH 65% ±4%, T 20±2°C) for at least 24 hours.

B. Property Testing (choose 2–3 tests)

- Tensile strength (Universal Strength tester)
- Abrasion resistance (Abrasion tester)
- Pilling assessment (Abrasion tester)
- Thickness (Thickness gauge)
- Surface mass (Analytical balance)

C. Data Documentation

- Use the Textile Testing Log Sheet below to record all sample information, test settings, parameters, results, and comments.

D. Self-Reflection

- Complete the Self-Evaluation Worksheet (see B below).

E. Supervisor Feedback

- Discuss completed testing, obtained results, and documentation with supervisor/mentor using the Mentor Evaluation Form.

2. Templates

A. Textile Testing Log Sheet

Sample ID	Test Property	Equipment Used	Test Conditions	Result	Notes/Observations

B. Self-Evaluation Worksheet

- What activities did you perform in this assignment?
- What part went best?
- What challenges or problems did you encounter?

- What new skills or knowledge about textile testing did you gain?
- How would you improve your work next time?
- Additional comments or questions:

C. Mentor Evaluation Form

Element	Excellent	Satisfactory	Needs Improvement
Understanding of task & protocols			
Accuracy of documentation			
Safe use of lab equipment & methods			
Independence and teamwork			
Quality of self-reflection			

Mentor comments and suggestions:

Final assessment:

- ☐ Met requirements
- ☐ Partially met requirements
- ☐ Needs repetition

Mentor signature: _____

D. Brief Feedback Card

- What went best: _____
- What would you change next time: _____
- One question for mentor/feedback: _____

3. Guidance for Learners and Supervisors

- Follow all lab safety and testing protocols.
- Make sure all samples and data are clearly labeled and traceable.
- Reflect honestly on your learning and results after completing the test.
- Supervisors: Use the template to provide constructive and supportive feedback.

WBL task: Laboratory Audit for Bio-Based Textile Testing

Objectives

- Experience a real-life internal laboratory audit for compliance and quality in textile testing.

- Learn to review protocols, documentation, equipment use, and adherence to standards (e.g., ISO 17025, GOTS, OEKO-TEX).
- Enhance your ability to spot non-conformities, propose corrective actions, and appreciate the importance of accurate record-keeping.

Steps for Learner

1. **Preparation**
    - Review the lab's audit checklist (covering sample handling, equipment calibration, test protocols, and documentation).
    - Study relevant standards and certification requirements for bio-based textile testing.
2. **Audit Execution**
    - Audit a selected section of the lab (e.g., sample preparation, mechanical testing, or data recording area) with your mentor/supervisor.
    - Observe work practices, check use and maintenance of equipment, and verify that procedures match documented protocols.
    - Review a set of sample records/log sheets for completeness and traceability.
    - If possible, conduct short interviews with staff about procedures and safety.
3. **Documentation**
    - Fill out the **Lab Audit Checklist** (see template below):
        - Are protocols and Standard Operating Procedures (SOPs) accessible and up-to-date?
        - Is equipment calibrated and records available?
        - Are sample logs and test results complete, labeled, and traceable?
        - Are safety and environmental guidelines clearly followed?
        - Are test reports compliant with certification requirements?
    - Note any non-conformities, best practices, or suggested improvements.
4. **Summary Report**
    - Prepare a brief audit summary (1–2 pages) including:
        - Main findings (compliant areas, violations, strengths)
        - Action points (who/what/when)
        - Reflection on the audit experience and suggestions for next time.
5. **Supervisor Feedback**
    - Discuss findings and report with the lab supervisor.
    - Complete mentor evaluation and feedback form.

Sample Lab Audit Checklist

Audit Item	Fully Met	Partly Met	Not Met	Comments
SOPs accessible & current				
Equipment calibration records				
Sample logs complete/traceable				

Audit Item	Fully Met	Partly Met	Not Met	Comments
Lab safety rules enforced				
Data integrity & security practices				
Compliance with certification req.				

Learner Reflection Questions

- Which aspects of the audit process worked well?
- What were the biggest challenges?
- Did you identify any risks or opportunities for improvement?
- What new knowledge did you gain about lab quality systems and standards?
- How would you improve the audit process in the future?

Supervisor/Mentor Evaluation

Audit Skill Area	Excellent	Satisfactory	Needs Improvement
Understanding audit scope/protocol			
Observation & documentation accuracy			
Communication with staff			
Proposing corrective actions			
Quality of reflection/report			

Comments:

Mentor signature: _____

Tips for Implementation

- Adapt the audit scope and checklist to match your lab's actual standards and ongoing improvement goals.
- Use the findings for continuous improvement discussions and strengthening lab procedures.
- Keep all audit documents in the learner's WBL folder/portfolio.

2.7. Module 7 - Digitalization in fashion eco-system through digital design, simulation and visualization in fashion industry

WBL Task 1: Digital Workflow Implementation Project

Duration: 2-3 weeks (adaptable to company schedule)
Related Units: 1 (Digital Design), 2 (3D Simulation), 4 (Digital Patternmaking & CAD-to-Manufacture)

Objectives: Apply the entire **concept – design - 3D – production** workflow inside the company and measure sustainability gains.

Steps:

1. Planning & Setup
    - With the supervisor, select one garment from the upcoming collection.
    - Define expected outcomes: reduction in sampling, estimated fabric savings, and lead-time target.
2. Digital Design & 3D Simulation
    - Create a digital mood board and sketch in 2D CAD or Adobe Illustrator.
    - Import patterns into CLO 3D or Browzwear; simulate drape and fit on multiple avatars.
3. Digital Patternmaking & Grading
    - Finalize patterns digitally; use parametric grading to create all size variations.
    - Apply automated nesting to optimize fabric use.
4. Tech Pack & PLM Integration
    - Prepare a complete digital tech pack (materials, measurements, visuals).
    - Upload to the company's PLM system or shared digital repository.
5. Impact Measurement & Presentation
    - Calculate reductions in fabric waste, CO_2 emissions, and physical samples compared to the company's typical process.
    - Present findings to the team (short PPT or poster).

Resources for Trainees

- Company's CAD or PLM software (e.g., Lectra, Gerber AccuMark, CLO 3D).
- Higg Index MSI or similar LCA calculator.
- Template: **Digital Workflow Project Sheet** (to track each step, time spent, and results).

Reflection & Feedback

- **Reflection log** (daily/weekly):
    - What worked well?
    - Which part of the digital workflow saved the most time/waste?
    - Skills I want to improve next.

- **Supervisor feedback template**:
    - Accuracy of digital files
    - Collaboration & communication
    - Sustainability impact achieved
    - Recommendations for wider adoption.

WBL Task 2 – Photorealistic Marketing Asset Creation

Duration: 1-2 weeks
Related Units: 2 (3D Garment Simulation), 3 (Digital Visualization & Photorealistic Rendering), 5 (Data-Driven Design)

Objectives: Produce a **fully photorealistic, marketing-ready product image or AR model** that the company can use for e-commerce or a virtual showroom.

Steps

1. Garment Selection & Data Gathering
    - Pick an item scheduled for launch.
    - Collect fabric scans, colorways, and brand style guidelines.
2. Rendering & AR Preparation
    - Use tools such as KeyShot, V-Ray, or Adobe Substance 3D to build PBR materials (albedo, normal, roughness, displacement maps).
    - Integrate with CLO 3D or Marvelous Designer to ensure garment accuracy.
3. Virtual Try-On / AR Integration (optional)
    - Prepare a 3D asset for AR viewing (e.g., glTF/GLB format).
    - Test on a mobile AR platform or the company's e-commerce portal.
4. Impact Analysis
    - Estimate physical sample reduction and marketing savings compared to traditional photography.

Resources for Trainees

- High-resolution fabric scanners or existing digital texture library.
- Rendering engine licenses or trial versions.
- Template: **Marketing Asset Brief** (outlines product, rendering settings, and sustainability metrics).

Reflection & Feedback

- **Reflection questions**:
    - What challenges did you face in achieving photorealistic quality?
    - How could this workflow replace traditional photo shoots?
    - What did you learn about PBR maps and AR preparation?
- **Supervisor feedback template**:
    - Visual realism and brand consistency
    - Potential cost/time savings

- Readiness for e-commerce or virtual showroom use.

Support Materials for Training Providers

- PowerPoint (SiT template) explaining:
  - Key digital tools (Lectra, CLO 3D, Adobe Substance, Higg MSI).
  - Sustainability benchmarks (e.g., 70% sampling reduction).
- Downloadable templates:
  - Project tracking sheet
  - Reflection log
  - Supervisor feedback form
  - Marketing asset brief
- Guidelines for mentors:
  - Schedule weekly check-ins (30 min).
  - Encourage discussion of technical issues and creative ideas.
  - Provide final evaluation and share results internally.

Outcome: These assignments help learners apply module theory directly in the workplace, develop measurable sustainability improvements, and create real deliverables (tech packs, 3D assets) that companies can use immediately.

2.8. Module 8 - Adaptability, communication skills and creative thinking in fashion industry

WBL Tas 1: Agile Communication Sprint for Sustainable Fashion

Objective: To apply agile communication and creative thinking in a real fashion workplace by designing a short, multi-audience campaign that promotes a sustainable product or initiative.

This activity is designed to help learners apply creative thinking and communication skills in a real or simulated fashion industry setting. Through a short, structured project, learners will work in teams to develop a communication campaign that promotes a sustainable fashion product or idea. The campaign will be tailored to different audiences—internal staff, external partners, and consumers—using agile methods and visual storytelling. By completing this activity, learners will strengthen their ability to adapt messages, collaborate effectively, and reflect on their creative process in a professional context.

Instructions for learner:

1. **Select a Sustainable Product or Concept.** Choose a real or hypothetical sustainable fashion item (e.g., recycled denim, biodegradable packaging, inclusive sizing concept).

2. **Stakeholder Mapping** Identify three key audiences:

- Internal team (e.g., production or design staff)
- External stakeholders (e.g., suppliers or partners)
- Consumers (e.g., retail or online shoppers)

3. **Sprint Planning**

A "communication sprint" is a short, intensive project focused on creating and delivering messages. It involves: planning what to say and to whom, designing visual and written content and sharing drafts, collecting feedback, and refining the message.

Use agile principles (Kanban or SCRUM) to plan a 5-day sprint. The term "Agile" refers to a flexible, iterative way of working. In this context, it means:

- Working in short, focused cycles (called "sprints")

- Quickly testing ideas and adjusting based on feedback

- Collaborating in teams with clear roles and goals

Kanban is a visual system for managing work while Scrum is a structured framework within Agile. It organizes work into short, focused cycles called sprints.

Example of a 5-day sprint:
- Day 1: Define goals and messages
- Day 2–3: Create content (visuals, text, digital assets)
- Day 4: Collect feedback from peers or supervisors
- Day 5: Refine and present final campaign

4. Create Communication Materials

Develop tailored messages for each audience using appropriate tone, format, and channels (e.g., internal memo, supplier email, social media post).

5. Reflection Task
Complete a guided worksheet reflecting on:
- How communication style was adapted
- How feedback influenced the final product

Deliverable:
- Completed stakeholder map
- Agile sprint board or timeline
- Three communication pieces (one per audience)
- Reflection worksheet
- Supervisor feedback form (optional)

Trainer guidelines:
- Provide PPT instructions and templates for stakeholder mapping, sprint planning, and message design
- Facilitate a short workshop on agile communication and visual storytelling
- Encourage learners to consult with workplace mentors or peers
- Review final outputs and reflections using a rubric (clarity, creativity, adaptability, relevance)

<u>Optional templates for training providers:</u>
Activity 1: Agile Communication Sprint for Sustainable Fashion

- Template 1: Stakeholder Mapping Template
- Template 2: Agile Sprint Board Template
- Template 3: Communication Design Template
- Template 4: Reflection Worksheet
- Template 5: Supervisor Feedback Form

3. Recycling Manager

3.1. Module 1 - Sustainability and Circular Economy in Textile/Fashion Industry – an Overview

WBL Task 1: Proposing sustainability Improvements in business model and marketing

Objective:
Enable learners to analyze a real company's current business model and marketing approach, identify opportunities for sustainability improvements, and propose actionable strategies.

1. Task Summary
You will work with a real company (or a case study if direct access is not possible) to investigate how sustainability can be integrated into its business model and marketing. The project should focus on practical, implementable recommendations that enhance environmental, social, and economic sustainability and maintaining competitiveness.

3. Key Steps and activities

1. Company analysis
- Research the company's current business model: products/services, value proposition, revenue streams, distribution channels, and customer segments.
- Analyze existing marketing approaches: messaging, channels, campaigns, and target audiences.
- Identify current sustainability initiatives (if any).

Deliverable: Short report (1 page) summarizing the current situation.

2. Sustainability gap assessment
- Evaluate environmental, social, and ethical gaps in the business model and marketing.
- Consider:
    - Product lifecycle impacts (materials, production, waste)
    - Supply chain transparency
    - Marketing communication on sustainability
    - Alignment with consumer expectations for sustainable products

Deliverable: Gap analysis table highlighting areas for improvement.

3. Proposal for sustainable improvements
- Develop actionable recommendations for integrating sustainability into:

Business model: e.g., eco-friendly materials, circular economy strategies, ethical sourcing, digital or low-impact logistics.

Marketing approach: e.g., communicating sustainability credibly, eco-labels, storytelling, campaigns targeting conscious consumers.

- Provide rationale, potential benefits, and feasibility considerations.

Deliverable: Proposal document or presentation (2–3 pages / 5–10 slides).

4. Reflection and learning

- Reflect on the assignment:

What challenges did you face in analyzing the company?
Which recommendations are most feasible or impactful?
How did this project enhance your understanding of sustainable business practices?
Deliverable: Reflection report (1 page).

5. Employers' / Supervisors' Activities

- Supervisor evaluates:

Depth and accuracy of company analysis
Quality and feasibility of sustainability proposals
Creativity and strategic thinking in marketing suggestions
Critical reflection and learning outcomes

Evaluation Criteria

Criteria	Excellent	Satisfactory	Needs improvements
Understanding of task			
Accuracy of data			
Practicality of suggestions			
Initiative and engagement			

Additional Comments:

_____

Final assessment:

- ☐ Met requirements
- ☐ Partially met requirements
- ☐ Needs repetition

Supervisor signature: _____

WBL Task 2: Mapping circular practices in textile recycling and sustainable branding

Objective: to apply theoretical knowledge of sustainability, circular economy, and ecodesign by analysing and improving real-world textile recycling and branding practices in a workplace setting.

Step 1: Select a textile product or waste stream

Choose a textile product or waste stream relevant to your workplace (e.g., denim scraps, blended fibers, unsold garments).

Step 2: Observe circular practices

Document how the product is handled across its lifecycle:

- Collection and sorting
- Recycling or reuse processes
- Branding and communication of sustainability efforts

Use a mapping template to visualize the flow from production to post-consumer recovery.

Step 3: Identify stakeholders and technologies

List all actors involved (e.g., designers, recyclers, logistics providers, marketing teams). Note technologies used (e.g., fiber separation machines, traceability platforms, eco-labeling tools).

Step 4: Evaluate sustainability and communication

Assess:

- Environmental impact (energy use, waste reduction)
- Social responsibility (labor practices, transparency)
- Branding effectiveness (messaging clarity, consumer engagement)

Use a **checklist** to identify strengths and gaps.

Step 5: Propose enhancements

Suggest improvements such as:

- More efficient sorting or recycling methods
- Stronger sustainability messaging
- Better collaboration between departments

Step 6: Reflect on the process

Complete a reflection worksheet:

- What did you learn?

- What surprised you?
- How does this connect to broader sustainability goals?

Deliverable:

- Circular process map
- Stakeholder and technology list
- Sustainability and branding audit checklist
- Proposal for improvement (300–500 words)
- Reflection worksheet
- Optional: Supervisor feedback form

Employers' / Supervisors' Activities

- Provide templates for mapping, auditing, and reflection
- Facilitate a workshop on circular systems and sustainable branding
- Encourage mentorship and peer feedback
- Review proposals using a rubric focused on clarity, feasibility, and sustainability impact

WBL Task 3: Material flow mapping in practice

Objective: To observe and analyse how materials, waste, or by-products are currently managed in your workplace, and to identify opportunities for circular improvement.

Step 1: Select a product, process, or department (e.g., cutting room, packaging, sourcing, warehouse).
Step 2: Trace the material flow:

- Where do raw materials come from?
- How are leftovers, offcuts, or defective items handled?
- What happens at the end of the process (reuse, disposal, recycling)?

Step 3: Identify at least one stage where waste or inefficiency occurs.

Step 4: Suggest a circular practice (reuse, redesign, recycling, resource recovery, or communication improvement) that could reduce the environmental footprint.

Deliverable:

- Complete the **Material Flow Observation Template** with:
- Process or product observed
- Key material inputs and outputs
- Waste or inefficiency points

- Suggested circular solution and expected benefits

Optional: Share your findings with a colleague or supervisor and ask if your suggestion could be piloted or tested.

Material flow observation template

Learner Name: _____
Date: _____
Workplace/Department Observed: _____

1. Process or product observed
(Briefly describe the product, process, or department you focused on)

---

2. Key material inputs
(List main materials entering the process, e.g., fabrics, trims, packaging)

---

3. Key material outputs
(List main products, by-products, or waste generated)

---

4. Waste or inefficiency points identified
(Where are resources being lost, wasted, or underutilized?)

---

5. Suggested circular solution
(Describe one practical improvement – reuse, recycling, redesign, communication, etc.)

---

6. Expected benefits
(Environmental, economic, or social advantages of your suggestion)

Optional – Feedback
(If discussed with a colleague/supervisor, summarize their reaction or feedback)

3.2. Module 2 - Management of Recycling Process Regulatory Compliance

WBL Task 1: Supplier engagement & traceability project

Objective: Practice monitoring supplier compliance and ensuring traceability in the recycling supply chain.

Assignment: Learner joins the company's sourcing or sustainability team to assist in a supplier compliance project.
Tasks:

- Collect data from 2–3 suppliers (e.g., certifications, waste handling documentation, recycling claims).
- Check traceability of recycled inputs (e.g., does documentation align with EU standards?).
- Interview a supplier (or simulate, if direct access is not possible) about challenges in meeting EU recycling requirements.

Practical task: Learner prepares a *compliance checklist* for supplier audits, including risk indicators (greenwashing, incomplete reporting, lack of EPR participation).
Output: A draft supplier audit tool or checklist that could be integrated into the company's Environmental Management System (EMS).

Learning Outcomes:

- Strengthening supply chain monitoring skills.
- Building competence in traceability and anti-greenwashing practices.
- Applying compliance knowledge to real supplier contexts.

WBL Task 2: Non-conformity case Log

Objective: To analyse how non-conformities are managed and propose corrective actions in line with ISO 14001 principles.

Instructions for learner:

- Think of a recent or ongoing case in your company (or simulate one if not available) where a regulatory non-conformity occurred (e.g., late waste reporting, improper labeling, missing documentation).
- Document the situation, including the process affected and stakeholders involved.
- Suggest corrective and preventive actions to resolve the issue and prevent recurrence.

Deliverable: Fill out the *Non-Conformity Reflection Template*, including:

Field	Details to Fill In
Description of the situation	What happened? Summarize the non-conformity clearly.
Stakeholders and processes affected	Who was impacted (e.g., workers, customers, suppliers)? Which processes were disrupted?
Regulatory and operational risks identified	What compliance issues or operational risks arose (e.g., safety, quality, sustainability, legal)?
Proposed corrective actions	Immediate steps to fix the issue.
Proposed preventive actions	Long-term measures to prevent recurrence.

Learning Outcomes:
Identify and document non-conformities by accurately describing situations, affected stakeholders, and related processes in line with ISO 14001 principles.

Evaluate regulatory and operational risks arising from non-conformities, linking them to compliance, safety, quality, or sustainability impacts.

Propose effective corrective and preventive actions that address immediate issues and establish long-term solutions to prevent recurrence.

3.3. Module 3 - Closed-loop concept in Textile/Fashion Production

WBL Activity 1: Designing for Closed-Loop Textile and Fashion Production

Relevant to: Unit1: Introduction to the Closed-Loop Concept in Textile/Fashion Production
Unit 2: Design and Materials for Closed-Loop Systems

Objective: To apply theoretical knowledge of closed-loop systems, design for recyclability, and material selection by analysing a real textile product or waste stream in your workplace. This activity encourages learners to understand how design decisions impact recyclability and circular use of textiles.

Description

Step 1: Select a Textile Product or Waste Stream
Choose a product from your workplace (e.g., T-shirt, jacket, workwear) or a waste stream (e.g., fabric scraps, unsold items).

Step 2: Analyse Design and Materials
Investigate:

- What materials are used (mono-materials or blends)?
- Are there elements that hinder recyclability (e.g., elastane, adhesives, metal trims)?
- Is the product designed for disassembly?

Step 3: Map the Closed-Loop Potential
Use a mapping template to visualise the potential flow of the product through a closed-loop system: from design → use → return → recycling → new use.

Step 4: Identify Barriers and Opportunities
Evaluate:

- What are the challenges to recycling this product?
- What design or material changes could improve circularity?

Step 5: Propose Improvements
Write a short proposal (300–500 words) with concrete recommendations for:

- Better material choices (e.g., mono-materials)
- Design for disassembly
- Clearer labeling (e.g., QR codes, digital product passports)

Step 6: Reflect on the Process
Answer the following:

- What did you learn about designing for closed-loop systems?
- What were the biggest challenges?
- How can you apply this knowledge in your future work?

Deliverable:

- Product and material analysis

Template

Product name / type:_____

Primary materials used:_____

Material origin (recycled, bio-based, etc.):_____

Durability / lifespan: _____

End-of-life options currently available:_____

Sustainability notes (strengths & weaknesses):_____

- Closed-loop process map

Design & Material Choice → Production → Distribution → Use Phase → Collection → Sorting → Recycling / Reuse → New Product

Notes: Indicate where the loop is strong/weak (e.g., recyclable material, but no local collection system).

- List of barriers and improvement opportunities

Learning Outcomes:

- Apply theoretical knowledge of closed-loop systems to analyse real textile products or waste streams.
- Identify design and material factors that enable or hinder recyclability and circular use.
- Develop practical proposals for improving product circularity, including material choices, design for disassembly, and labeling strategies.

WBL Activity 2: Waste stream audit for Closed-Loop opportunities

Relevant to: Unit 3: Circular Business Models and Reverse Logistics, Unit 4: Implementing Closed-Loop Systems in Practice

Objective:
To conduct a workplace-level waste audit that identifies textile waste streams and evaluates how they could be reintegrated into a closed-loop system. Learners will strengthen their ability to link waste management practices with circular economy principles by applying auditing and analysis skills in a real operational context.

Description:

Step 1: Select a Waste Stream
Choose a specific waste category at your workplace (e.g., production offcuts, unsold garments, post-consumer returns, defective items).

Step 2: Collect Data
Record:

- Approximate volume/weight of waste produced per week/month
- Types of materials (cotton, polyester, blends, etc.)
- Current disposal/management methods (landfill, incineration, downcycling, resale, recycling)

Step 3: Assess Circular Potential
Analyse the waste stream for:

- % that could be mechanically or chemically recycled
- Barriers to closed-loop recovery (e.g., fibre blends, contamination, missing infrastructure)
- Potential partners for reuse/recycling (local recyclers, NGOs, take-back schemes)

Step 4: Map the Reverse Logistics Pathway
Create a simple flow diagram showing how the waste could move through a closed-loop pathway (from collection → sorting → recycling → reintegration into new textiles).

Step 5: Develop Recommendations
Write a short workplace report (2–3 pages) proposing:

- Strategies to reduce waste at source
- Ways to redesign logistics for higher recovery (e.g., take-back bins, supplier agreements)
- Practical actions the company could implement within 6–12 months

Step 6: Reflect and Share

Answer briefly:

- What surprised you most about the waste audit?
- What quick wins could be implemented immediately?
- How could this exercise influence long-term circular strategies in your workplace?

Deliverables

- Waste audit table (waste type, quantity, current management, recyclability potential)
- Reverse logistics flow diagram

Learning Outcomes:

- Conduct a systematic audit of workplace textile waste streams, collecting and organising quantitative and qualitative data.
- Evaluate the circular potential of different waste types and identify barriers to closed-loop recovery.
- Propose actionable strategies to reduce waste, improve recovery, and integrate circular practices into operational workflows.
- Map reverse logistics pathways and communicate findings clearly to support decision-making in a real operational context.

WBL Task 3 Tracing and Evaluating the Closed Loop Potential of One Product

Objective: Apply learning to a real product or process.

Description:

- Select a product or production process used in your workplace.
- Trace the material and design choices. Evaluate whether these support a closed loop.
- Identify at least 2 barriers and suggest solutions or improvements.
- Reflect on the internal collaboration needed to close the loop.

Deliverables:

- Short written report (max 2 pages) or slide deck
- Include a flow diagram and a checklist (template provided)
- Supervisor or mentor provides short feedback using evaluation rubric

Materials::

- Closed Loop Product Evaluation Template (flow + checklist)

Stage	Key Aspects	Details to Fill In	✔ / ✖
1. Design & Materials	Material type		☐
	Source (virgin / recycled / bio-based)		☐
2. Production	Processes used		☐
	Key sustainability notes		☐
3. Distribution & Retail	Packaging		☐
	Logistics		☐
4. Use Phase	Durability		☐
	Care requirements		☐
5. Collection / Take-Back	Available systems		☐
	Consumer engagement		☐
6. Sorting & Recycling / Reuse	Technology available		☐
	Challenges		☐
7. New Product Creation	Potential outputs		☐

Learning Outcomes:

- Trace material and design choices for a product or process and evaluate alignment with closed-loop principles.
- Identify barriers to circularity and suggest practical solutions or improvements.
- Apply internal collaboration and stakeholder engagement skills to support closed-loop implementation.
- Produce clear, structured documentation (flow diagram, checklist, report) to communicate findings and recommendations.

3.4. Module 4 -Textile Recycling Technologies and Supply Chain Management

WBL Task 1: Reverse Logistics Mapping for Textile Recycling

Objective:
To apply knowledge of textile recycling and supply chain logistics by mapping and analysing reverse logistics processes in a real or simulated workplace.

Instructions for learners:

1. Select a textile product or waste stream (e.g., cotton offcuts, polyester garments, mixed fibers).
2. Observe reverse logistics in action: document how waste is collected, sorted, stored, and transported.
3. Identify stakeholders and technologies: include collection centers, logistics providers, recyclers, and any digital tools (NIR sorting, RFID, DPPs).
4. Evaluate sustainability and efficiency using a checklist (energy use, transport distances, waste reduction, traceability).
5. Propose enhancements such as improved sorting methods, supplier engagement, or route optimisation.
6. Reflect on the process: What did you learn? What surprised you? How does this connect to broader sustainability goals?

Deliverables:

- Reverse logistics map
- Stakeholder and technology list
- Sustainability audit checklist
- Short proposal for improvement (300–500 words)
- Reflection worksheet
- Optional: Supervisor feedback form

Supervisor guidelines:

- Provide mapping templates and sustainability audit checklists.
- Introduce transparency tools (e.g., Digital Product Passports, blockchain).
- Evaluate proposals based on clarity, feasibility, and sustainability impact.

Learning Outcomes:

Map and describe reverse logistics processes for textile recycling in a real or simulated workplace.

Identify key stakeholders, roles, and technologies involved in collection, sorting, and transport.

Assess sustainability and efficiency factors such as energy use, transport distances, and traceability.

WBL Task 2: Technology Assessment Matrix

Objective: To evaluate different recycling technologies through a comparative decision-making framework.

Instructions for learners:

1. Build a **matrix** comparing at least three recycling approaches:
    - Mechanical recycling
    - Chemical depolymerisation / selective dissolution
    - An emerging technology (e.g., enzymatic recycling, hydrothermal process).
2. Assess each option across five indicators:
    - Output quality
    - Tolerance to blends
    - Technology maturity (TRL)
    - Feedstock requirements
    - Economic cost
3. Discuss trade-offs and highlight contexts where each method is most appropriate.
4. Prepare a short written analysis (400–600 words) explaining your conclusions.

Deliverables:

- Completed technology matrix
- Short comparative analysis

Supervisor guidelines:

- Provide case studies (e.g., Renewcell, Carbios, Worn Again Technologies).
- Encourage critical thinking: remind learners that no single technology is a universal solution.

Learning Outcomes:

Compare different recycling technologies across defined indicators (output quality, tolerance to blends, maturity, feedstock, cost).
Analyze trade-offs between technological, economic, and environmental factors.
Identify suitable contexts where specific recycling methods are most appropriate.

WBL Tas 3: Pilot Program Design Brief

Objective:
To design a pilot project that tests the feasibility of an innovative recycling technology within the workplace.

Instructions for learners:

1. Select an emerging technology (e.g., enzymatic PET recycling, solvent-based separation of poly-cotton).

2. Draft a **Pilot Program Design Brief** (1–2 pages) including:
    - Objective of the pilot
    - Specific feedstock to be tested (e.g., 50/50 poly-cotton shirts, post-consumer denim)
    - Key performance indicators (KPIs) such as yield, purity, solvent recovery rate, energy use
    - Major risks and mitigation strategies
      Expected benefits (economic, environmental, reputational)

3. Present the design brief in a short oral presentation (5 minutes per group).

Deliverables:

- Pilot Program Design Brief (1–2 pages)
- Oral presentation slides or notes

Supervisor guidelines:

- Provide TEA (Techno-Economic Assessment) and LCA (Life Cycle Assessment) examples.
- Stress the value of starting small with controlled feedstock before scaling up.
- Evaluate feasibility, creativity, and integration with workplace context.

Learning Outcomes:

Draft a pilot project proposal that tests the feasibility of an innovative textile recycling technology.

Define clear objectives, feedstock requirements, and measurable KPIs for a workplace trial.

3.5. Module 5 - Environmental Regulations and Chemical Safety Standards in Textile Processes

WBL Task: Chemical safety and compliance Audit in the workplace

Objective: Apply regulatory knowledge and chemical safety principles to assess real-world textile facility practices.

Description:

1. **Preparation (in class / e-learning):** Learner reviews checklists for compliance with REACH, ZDHC, and OEKO-TEX, plus safe handling guidelines (SDS, PPE, storage, waste disposal).
2. **On-site Task (at workplace):**
    - Inspect storage areas for textile chemicals (check labeling, segregation, ventilation).
    - Review a sample of Safety Data Sheets (SDS) for completeness and accessibility.
    - Observe how workers handle chemicals and whether PPE is used correctly.
    - Identify whether spill kits, emergency showers, and fire extinguishers are available and maintained.
    - Check whether documentation/reporting for chemical use aligns with company or certification requirements.

3. **Analysis:** Compare observations against regulatory requirements and best practices.
4. **Output:** Learner produces a short *compliance audit report* with:
    - Strengths (good practices).
    - Non-conformities (gaps, risks).
    - Actionable recommendations (e.g., training needs, storage improvements, supplier alignment).

Learning Outcomes:

- Applying theoretical knowledge of regulations to a *real factory context*.
- Developing practical auditing and monitoring skills.
- Building competence in spotting compliance risks and recommending improvements.

3.6. Module 6 - Environmental Impact and Carbon Footprint of the TCLF industry

WBL Task 1: Conduct a Facility Hotspot Assessment

Objective: Help participants apply life cycle thinking in their own facilities by identifying environmental "hotspots" and opportunities for improvement.

Instructions for learner:

Assess the main operational stages in your facility: intake, sorting, processing, and dispatch.

Record energy use, water consumption, chemical use, and waste generation at each stage.

Identify at least two key hotspots with the highest environmental impact.

Propose possible improvements (e.g., upgrading machinery, optimizing sorting procedures, reducing water use).

Deliverable:

A short report or presentation (3–5 slides or 1-page summary) outlining findings and recommended actions.

Optional:

Provide a simplified template for recording data and observations (e.g., tables or checklist format).

Offer example improvement strategies or case studies for inspiration.

Learning Outcomes:

Identify environmental hotspots within their facility across operational stages (intake, sorting, processing, dispatch).

Collect and analyze data on energy use, water consumption, chemical use, and waste generation.
Propose practical improvements to reduce environmental impact.

WBL Task 2: Design a "Product Passport" for Improved Sorting

Objective: Strengthen skills in tracking and traceability to improve sorting and future recycling outcomes.

Instructions for learner:

- Choose one typical product type received at your facility (e.g., cotton T-shirt, polyester jacket).
- Create a simplified "product passport" that would help future sorting and recycling (including material composition, dye and finish details, detachable elements).
- Identify what information is currently missing or unclear and propose solutions (e.g., QR codes, clearer labeling).

Deliverable: A sample product passport template or illustrated example with explanatory notes.

Trainer guidelines:

- Provide a basic passport template and examples of digital traceability solutions.

- Encourage discussion with colleagues about practical challenges in implementing this system.

Learning Outcomes:
Create a product passport that improves material traceability and sorting.

Identify missing or unclear product information that affects recycling outcomes.

WBL Task 3: Staff Awareness Mini-Training Session

Objective: Encourage participants to practice knowledge-sharing and internal capacity building.

Instructions for learner:

- Prepare and deliver a short (15–20 min) mini-training for your colleagues on a topic from the module (e.g., eco-design, safe material handling, LCA basics).
- Include key definitions, real examples, and practical tips for daily work.
- Collect feedback from colleagues about what they learned and any suggestions they have.

Deliverable: A copy of the training slides (if used) or a short written outline of the session content and participant feedback summary.

Trainer guidelines:

- Provide a short slide template (SiT format).

- Suggest incorporating images, diagrams, and one or two practical examples.


Learning Outcomes:
Design and deliver a short internal training session on a sustainability topic.
Communicate key concepts, definitions, and practical tips effectively to colleagues.

WBL Task 4: Staff Awareness Mini-Training Session

Objective: Strengthen participants' ability to promote circular practices beyond the facility.

Instructions for learner:

Review current customer-facing communication (labels, website content, return policies).

Identify opportunities to encourage better garment disposal, reuse, or return for recycling.

Develop a short improvement plan with three actionable ideas (e.g., clearer recycling instructions, incentives for returns, awareness campaigns).

Deliverable: A one-page action plan summarizing current gaps and proposed solutions.

Trainer guidelines: Provide examples of successful customer engagement strategies (e.g., take-back schemes, store posters, digital campaigns) and support participants in setting realistic, achievable action points.

Optional templates for training providers:

1. Templates for assessments and reports (e.g., hotspot checklist, product passport draft).
2. Example slides or short presentation outlines.
3. Resource folder with sample case studies, visuals, and quick facts from the module.
4. Optional: Simple PPT slide templates for internal training or action plan presentations.

Learning Outcomes:
Review and evaluate current customer-facing communication for sustainability opportunities.
Develop actionable plans to encourage better garment disposal, reuse, or return for recycling.

3. 7. Module 7 - Critical Thinking and Problem-solving in Fashion Industry

WBL Task 1: Personal Bias and Sustainability Reflection

Relevant to: Unit 1 (Introduction to Critical Thinking in the Fashion Industry)

Objective: Develop self-awareness of how personal assumptions and biases affect workplace decisions, and identify ways to make more sustainable, circular-economy-aligned choices.

Instructions for Learner: Reflect on your own decision-making processes and consider the potential influences on your assumptions, the Biases and proactively make improvements. Look into how your personal beliefs shape the decisions you make at the workplace and consider the common cognitive biases you might fall into (eg. Status quo or Optimism). Then, identify one concrete action you can take within a specific period of time (eg. next month) to reduce the biases and make decisions that are more aligned with circular economy principles.

Guidelines: Use the Reflection Journal template to structure your thoughts and link reflections to real workplace examples whenever possible.

Output: Completed Reflection Journal.

Co-funded by the European Union

Reflection Journal Template

Reflection Question	Personal Response
How do my assumptions influence my decisions?	
Which biases do I tend to fall into?	
One concrete action I can take	

Learning Outcomes:
Identify personal assumptions and cognitive biases that influence workplace decisions.

Reflect on how individual beliefs affect sustainable and circular-economy-aligned choices.

Develop actionable strategies to reduce bias in decision-making.

Demonstrate self-awareness in applying critical thinking to real workplace scenarios.

WBL Task 2: Circular Economy Check in Practice

Relevant to: Unit 2 (Critical Thinking in the Circular Textile Economy)

Objective: Evaluate how well your workplace aligns with circular economy principles and identify areas for improvement.

Instructions for Learner: Review your company´s practices in materials used, packaging choices and waste handling. Then, complete the Circular Economy Checklist provided and identify one strong practice and one improvement area for the workplace. From here, write a short report (1-2 pages) summarising your findings.

Guidelines: Use real company data where possible and look at SME examples, such as France EPR for funding textile collection and recycling.

Output: Complete the checklist and write the summary report with your key findings and recommendations for improvement.

Checklist Template

Principle	Guiding Question	Yes/No	Notes	Examples
Materials recyclable	Are the main materials recyclable at end-of-life?			Polyester blends are hard to recycle.
Design for disassembly	Can the product be easily taken apart for recycling?			Shoes with stitched soles are easy to take apart and reuse.
Use of Recycled Content	Does the product include recycled fibres or materials?			Shirt with 30% recycled cotton.
Transparency in Supply Chain	Is sourcing info available and verifiable?			Supplier certifications.
End-of-life Strategy	Is there a plan for what comes after use?			Recycling or return-to-store scheme.


Learning Outcomes:
Evaluate workplace practices against circular economy principles (materials, packaging, waste handling).
Identify strengths and improvement areas in their organization's sustainability practices.
Apply analytical skills to assess real company data and generate practical recommendations.

WBL Task 3: Micro Circular Initiative

Relevant to: Unit 3 (Problem-Solving Frameworks and Tools)

Objective: Implement and test a small, realistic sustainability improvement that fits your workplace context. The aim is to apply circular economy thinking in a practical way and demonstrate how even small changes can create measurable impact.

Instructions for Learner: Choose one improvement idea for your workplace, such as redesigning some packaging or starting repair workshops for fabrics and accessories. Then, apply the Design Thinking cycle and embody the main characteristics of a true Design Thinker (Empathy, Ideation, Prototype and Test).

Guidelines: Draw inspiration from SME examples, such as I:CO with its textile collection points in-store. Use the Design Thinking Worksheet provided.

Output: Prepare a short project summary with your chosen improvement and reasoning. Include the steps taken in your Design Thinking cycle and show your results or arly feedback, with some recommendations for improvement.

Design Thinking Worksheet

Project Title:
Team Members:

Phases:

1. **Inspiration:** Define the challenge

   Problem Statement:_____

   Understand the needs through Empathy:

   - Who is affected by this problem?
   - What are their sustainability concerns?

2. **Ideation:** Generate Ideas.
   Possible solutions:
   - _____
   - _____
   - _____

3. **Implementation:**
   Prototype

   - Prototype description:_____

- Resources needed:_____

Final Test

- Who will test it?
- What is the feedback?
- What could be improved?

 Learning Outcomes:
Implement a small-scale sustainability improvement in the workplace using Design Thinking principles.
Apply the full Design Thinking cycle: empathy, ideation, prototyping, testing.
Document and present practical interventions with rationale and early feedback.

WBL Task 4: SWOT and PESTEL Mini-Analysis

Relevant to: Unit 3 (Problem-Solving Frameworks and Tools)

Objective: Apply strategic analysis tools to evaluate a sustainability-related business challenge or initiative in your workplace, and generate actionable insights for decision-making.

Instructions for Learner: Review your company´s practices, selecting a current or planned sustainability-focused project. It could be something such as reducing water usage in manufacturing or implementing a zero-waste production process.
After choosing your initiative, conduct a SWOT Analysis to study your initiative´s internal and external factors, further complementing it with a PESTEL Analysis. This way you can evaluate the external environment and identify factors impacting your initiative (from political to legal).
To follow your Analysis, identify the strategic insights that you believe are most critical for management decision-making, integrating findings from the analyses.

Guidelines: Use the provided SWOT and PESTEL templates.

Output: Create a poster summarising your findings, with integrated insights from your analyses and recommendations.

SWOT Template

Strengths (Internal and Positive)	Weaknesses (Internal and Negative)	Opportunities (External and Positive)	Threats (External and Negative)

PESTEL Template

Factor	Key Issue Identified	Impact on Company
Political		
Economic		
Social		
Technological		
Environmental		
Legal		

Learning Outcomes:
Apply SWOT and PESTEL frameworks to analyze sustainability-focused initiatives in the workplace.
Identify internal and external factors that affect environmental and business outcomes.
Generate strategic insights to support evidence-based management decisions.

Supervisor Feedback Template

(Yes/No Answers)

Training Module: M7 – Recycling Manager
Workplace Assignment/Project:
Learner Name:
Supervisor/Assessor:
Date:

1. Task Completion

- Assignment delivered on time?
- Followed given instructions & guidelines?
- Quality of documentation/presentation adequate?

Notes:

2. Application of Critical Thinking

- Identified relevant biases/assumptions?
- Applied frameworks effectively (e.g. SWOT, PESTEL)?
- Proposed well-reasoned, evidence-based alternatives?

Notes:

3. Practical Relevance

- Solutions/actions realistic for the workplace?
- Clear link to sustainability or circular economy goals?
- Potential for positive workplace impact?

Notes:

4. Reflection & Learning

- Learners demonstrated awareness of their own thinking process?
- Identified personal biases or habits?
- Suggested specific improvements for future practice?

Notes:

5. Overall Evaluation

Strengths Observed:
Areas for Improvement:
Recommended Next Steps:
Trainer Signature:
Date:

3.8. Module 8 - Leadership and Management in Textile/ Fashion Industry

WBL Task 1: Team performance check-in and sustainability alignment

Relevant to: unit 2 (Leading teams) & unit 3 (Strategic thinking)

Objective: To practise evaluating team dynamics and aligning efforts with sustainability goals.

Instructions for learner:

- Arrange a short team meeting or shadow your supervisor during one.
- Observe how tasks and responsibilities are distributed.
- Reflect on how sustainability or circularity goals are communicated (if at all).
- Identify one area where alignment with sustainability could be improved.

Optional: Share your improvement idea with a team member or supervisor and request short verbal feedback.

Deliverable: Complete the Team alignment observation sheet with notes on observed practices, one improvement idea, and how it aligns with circularity.

Template 1: Team alignment observation sheet

Learner name:
Date:
Workplace/team:

1. Meeting or interaction observed:
(Briefly describe what meeting or team activity you observed. Who was involved? What was the context?)

---

2. Key sustainability or circularity goals mentioned (if any):
(Write down if and how sustainability goals were communicated during the meeting or task.)

---

3. Team roles and task distribution:
(Was it clear who was responsible for what? How were responsibilities communicated?)

---

4. Barriers or gaps observed:
(Did you observe any misalignment, lack of clarity, or disconnect with sustainability goals?)

---

5. Suggested improvement:
(What is one specific action the team could take to better align with sustainability objectives?)

6. Alignment with circular economy principles:
(Explain briefly how your suggestion supports more circular or sustainable practice.)

Learning Outcomes:
Observe and evaluate team dynamics and task distribution in a workplace setting.
Identify how sustainability and circular economy goals are communicated within a team.

Recognize barriers or gaps in aligning team activities with sustainability objectives.

WBL Task 2: Ethical decision log – mini case review

Relevant to: unit 1 (Introduction) & unit 4 (Ethical leadership)

Objective: To critically analyse a recent workplace situation that involved a leadership or ethical decision.

Instructions for learner:

- Think of a recent or ongoing work situation involving decision-making (e.g. a change in supplier, team scheduling, materials use).
- Briefly describe the situation and the decision made.
- Evaluate whether ethical, environmental or team well-being concerns were considered.
- If not, propose how responsible leadership principles could be applied.

Deliverable: Fill out the template.

Template 2: Ethical leadership reflection template

Learner name:
Date:
Workplace/scenario:

1. Describe the situation:
(Provide a short description of a recent work decision or scenario you observed or were involved in.)

---

2. Who were the stakeholders involved?
(List the people or groups affected by the decision.)

---

3. Ethical/social/environmental impacts:
(What were the impacts of the decision? Were ethical concerns or sustainability principles considered?)

---

4. What could have been done differently?
(Identify any missed considerations and how the decision could have been improved.)

---

5. Your recommendation:
(Write a short proposal for how the situation could have been approached using responsible and ethical leadership.)

Learning Outcomes:
Analyse real workplace situations involving leadership or ethical decisions.
Identify stakeholders and assess the ethical, social, and environmental impacts of decisions.
Evaluate whether responsible leadership principles were applied and identify gaps.

Optional templates for training providers:

Template 3: Supervisor feedback form

Employee/learner name:
Supervisor name:
Date of review:

Task reviewed:
(Please indicate which task the learner completed)

Criteria	Excellent	Good	Needs Improvement	Comments
Engagement and initiative				
Application of leadership principles				
Communication and collaboration				
Reflective thinking and learning				

Overall comment or advice for learner:

Annex 3: ICEP – Framework for Certification, Validation, Recognition and accreditation of the SiT training

This task is focused on developing a framework for transnational certification and accreditation of the training provided by SiT. This is an important step in ensuring that the training is recognized and valued by stakeholders in the TCLF sector. By aligning the certification and accreditation of the training with the EQF, ECTS standards, and micro-credentials, the project can ensure that the training meets high quality and transparency standards. It will help to ensure that learners are able to demonstrate their skills and knowledge effectively to potential employers or further education providers. By setting a procedure for national accreditation for VET training and pursuing it throughout the project lifetime, the project can ensure that the training is recognized and valued at the national level as well. Including the final policy recommendation with the accreditation procedure will also help to ensure that the framework is sustainable and can be implemented beyond the project lifetime. Overall, the development of a framework for transnational certification and accreditation is a critical component of the project. By ensuring that the training is recognized and valued, the project can help to support the development of a skilled workforce in the TCLF sector and contribute to its growth.

Introduction

One of the project partners is ICEP - Institute of European Certification of Personnel. This company was established in 2009 as an **Accreditation, certification or qualification body** and is based in Slovakia. ICEP has 15 years of experience as an accreditation, certification or qualification body and **acts as the leader in the certification sector for the recognition, certification and validation of digital competences**. ICEP certifies the verifiable formal and non-formal competences of professionals and individuals, through a set of standardised requirements, procedures and quality assurance measures, **in accordance with International Standards**.

ICEP Certifications:

- Accredited Certification of Personnel,
- Non-accredited Certification of Personnel,
- Competences acquired in European Projects,
- ICEP Approved © Courses,
- Transversal Competences.

Accreditations:
Certification of Competence is subject to supervisions and controlled by competent authorities; in Slovakia, the Slovak National Accreditation Service (SNAS, member of MLA) is the designated institution for the accreditation of certification bodies according to ISO/IEC 17024:12, requiring independence, competence and impartiality. In fact, the certification of competence can only represent an added value if the assessment and certification process is performed by an **Independent Third Party**. ICEP has been granted a SNAS accreditation for the **Auditor QMS Scheme - Reference code: O-020**.

ICEP will cross-reference mainly the Classification of European Skills, Competences, Qualifications and Occupation (ESCO) with the Entrepreneurship Competence Framework (EntreComp) and the European Qualifications Framework (EQF) to certify basic and transversal skills, entrepreneurship and business innovation.

ICEP utilizes a Management Manual accredited by the Slovak National Accreditation Service (SNAS), which is the local body designated for the accreditation of certification bodies according to **international standard ISO/IEC 17024**. This standard defines specific requirements of independence, competence and impartiality, in order to offer a real guarantee of quality of available certification services.

ICEP is accredited and validated according to the national system of Management System ISO/IEC 17024:2015 accredited by NAB for Auditor ISO 9001:2015. This company can offer their secured **dedicated certification platform** https://competenceinstitute.com/ for online certification exams and in the case of successful completion of the test requirements set according to international standards **issue a digital certificate of competences with the currency of 5 years and recognized by countries in the European Union**.

The **Framework for certification, validation, recognition and accreditation is created for the project SiT – Sustainability in TCLF sector**, where 2 new professions were created and defined, to validate the new training modules and material and to recognize the new competences and skills for new professions with the aim to enhance the opportunities on the labour market. This proscriptive document called **Certification Protocol** is designed for SiT project partners and relevant stakeholders working and operating in TCLF sector, for example:

- representatives from government agencies (e.g., employment services, education departments),
- educational institutions (e.g. universities, schools, vocational training centres),
- researchers and policymakers in the related field,

- non-governmental organisations (NGOs),
- other workers and career counsellors.

Certification Protocol

Certification Protocol is a descriptive procedural document aimed at providing the **essential information and guidelines related to certification, validation and recognition of the project identified and specific competences in the frame of the international norms and standards**. This document contains guidelines to validate and certify the identified competences.

In establishing policies that safeguard and proactively support the establishment and further development of people who want to learn and work in TCLF sector at all levels, **protocol for certification of competences and validation framework aims to**:

1. creating a specific and clear validation and certification path of the skills, testing new approaches to developing and accessing social and intercultural competences and critical thinking,
2. providing a source of inspiration and a reference document for national and international organisations and social service providers who offer education and training for adults. Further, this competence model supports adult workers themselves in assessing their own competences. This in turn helps them identify areas where they need further training,
3. helping institutional stakeholders determine adult workers' occupational profiles and the recognition of this profession by society,
4. identifying and describing adult worker competences better, this will help improve the image and recognition of adult workers in society. At the same time, we have developed strategies, tools and educational materials that will make capacity-building more effective.

The Protocol for Certification of Competences focuses on competences identified from the project partner organisations in the previous project outputs - defined in the SiT curriculum and training structure analysis. These competences identified in the project SiT were to prepare, implement and evaluate learning pathways for people who want to learn and work in the TCLF sector to foster diversity and social inclusion of the project targeted groups.

Certification Protocol of Competences for SiT Training

According to the **Classification of European Skills, Competences, Qualifications and Occupation (ESCO)** which identifies and categorises skills, competences, qualifications and occupations relevant for the EU labour market and education and training, adult worker profile comes with an occupational profile and a list of the knowledge, skills and competences that experts considered relevant terminology for this occupation on a European scale.

During the development of the project, the following two professional profiles were identified:

1. **Bio-Textile Technician (EQF Level 5),**
2. **Textile Recycling Manager (EQF Level 6).**

In the **ESCO's Database of Professional Profiles** we found as an example the profession "recycling specialist" (code 2143) which include profiles for recycling management and related roles: specialist, coordinator, supervisor, consultant, technician, trainee etc. The description of this profession is: Recycling specialists research recycling policies and legislation and supervise implementation in an organization to ensure that waste management occurs according to regulations. They perform inspections, provide recycling equipment, and supervise recycling workers. They also advise organisations on ways they can improve their waste management procedures.
For the second professional profile we found in the ESCO's definition as an example the "finishing textile technician" (code 8154): Finishing textile technicians perform operations related to setting up finishing processes. The finishing processes are the final series of operations that improve the appearance and/or usefulness of textiles.

For our project's Certification Protocol, we can adapt these definitions regarding the main objectives of the project and the target groups, which includes the two new professional profiles in TCLF sector, to increase their knowledge, skills and competences to be able to get employed in the relevant sector.

These profiles relate to the **European Qualifications Framework (EQF)**, which provides a common reference framework which assists in comparing the national qualifications systems, frameworks and their eight levels. Each of the **8 levels of the EQF** is defined by a set of descriptors indicating the learning outcomes relevant to qualifications at that level in any qualifications system. The learning outcomes are defined in terms of:

- **Knowledge**: in the context of EQF, knowledge is described as theoretical and/or factual.

- **Skills**: In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).
- **Responsibility and autonomy**: In the context of the EQF responsibility and autonomy is described as the ability of the learner to apply knowledge and skills autonomously and with responsibility.

For Level 5 – learning outcomes:

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

For Level 6 – learning outcomes:

- **Knowledge**: Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles
- **Skills**: Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study
- **Responsibility and autonomy**: 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

During the development of the project, the survey identified several competencies that are essential for two new professional profiles to succeed in their role. These key competencies can be divided into technical skills, soft skills, and knowledge of regulatory standards. The following two professional profiles were identified with these related key competencies:

1. **Bio-Textile Technician (EQF Level 5):**

Functional competencies: knowledge of bio-based materials and processing techniques, textile production techniques (weaving, knitting, non-woven), bio-technology and bioengineering expertise, quality control and testing methods, Life Cycle Assessment (LCA), proficiency in chemistry (organic and inorganic), machinery operation and maintenance, process optimization and efficiency, environmental regulations and standards.

Green competencies: sustainable sourcing and supply chain transparency, energy efficiency and renewable energy, sustainable innovation and research, problem-solving and decision-making.

Transversal competencies: critical thinking and analytical skills, creativity and innovation, communication and collaboration, leadership and team management, time management and organizational skills, adaptability and continuous learning, digital literacy and technological proficiency.

2. **Textile Recycling Manager (EQF Level 6):**

Functional competencies: knowledge of recycling technologies, material science, waste management regulations and circular economy principles, supply chain management, sustainability practices, chemistry and chemical engineering, process optimization and efficiency, machinery operation and maintenance, quality control and testing methods.

Green competencies: environmental regulations and standards, sustainable sourcing and supply chain transparency, energy efficiency and renewable energy, sustainable innovation and research, Life Cycle Assessment (LCA).

Transversal competencies: problem-solving and decision-making, critical thinking and analytical skills, creativity and innovation, communication and collaboration, leadership and team management, time management and organizational skills, adaptability and continuous learning, digital literacy and technological proficiency.

ICEP cross-references the Classification of European Skills, Competences, Qualifications and Occupation (ESCO) and the European Qualifications Framework (EQF) and structured the Protocol for Certification of Competencies for our target groups. This Regulation is binding for both the Parties (Certification body and the aspiring adult people in the context of the project aim).

Procedure for National Certification and Accreditation

Validation of non-formal and informal competences plays an important role in promoting lifelong learning, enhancing social inclusion, and boosting the employability of individuals. The process allows individuals to identify, document, assess, and certify their full range of abilities, competences, and knowledge acquired throughout life. This learning may have been gained from non-formal, informal settings, or work experience.

COUNCIL RECOMMENDATION of 20 December 2012 on the validation of non-formal and informal learning (2012/C 398/01) - this Recommendation provides

important indications and guidelines for EU Member States to promote and facilitate the validation of non-formal and informal learning.
The Recommendation is based on the recognition that non-formal and informal learning plays a significant role in the development of skills and the training of individuals, including outside the formal context of vocational education and training. Non-formal learning refers to those intentional learning processes that take place in structured contexts, such as courses, workshops or training programmes organised by organisations or institutions. Informal learning, on the other hand, refers to those learning processes that occur spontaneously and unstructured through everyday life experiences, social interactions or work experiences. The Recommendation on the validation of non-formal and informal learning contains a number of indications aimed at promoting the validation of competences acquired through these processes.

Among the main indications contained in the Recommendation are the following:

- establishment of validation systems: Member States are invited to develop and promote systems of validation of competences acquired through non-formal and informal learning. These systems should be based on clear, transparent and consistent procedures for the assessment and recognition of competences,
- involvement of all actors: Member States are encouraged to actively involve all relevant actors, such as training institutions, public authorities, private sector organisations, trade unions and civil society organisations, in the competence validation process. This involvement fosters the integration and harmonisation of validation approaches and practices,
- clear assessment criteria: Member States are invited to define clear and valid assessment criteria for the validation of competences. These criteria should be established to reflect the quality standards required in the labour market and in different areas of activity,
- creation of tools and procedures: Member States are encouraged to develop specific tools and procedures to facilitate the validation of competences. These tools may include competence portfolios, documentation of non-formal and informal learning experiences, and evaluation procedures suitable for assessing acquired competences,
- formal recognition of competences: Member States are encouraged to recognise validated competences through appropriate certificates or attestations. This formal recognition of competences acquired through non-formal and informal learning provides individuals with an opportunity to improve access to employment, lifelong learning and professional mobility,
- promotion of awareness and information: Member States are encouraged to promote awareness and information about the importance of validating non-formal and

informal learning among individuals, organisations and the general public. This helps to value non-formal and informal learning as an integral part of the lifelong learning pathway.

The Recommendation on the validation of non-formal and informal learning is therefore an important guidance tool for EU Member States to promote the validation of competences acquired through non-formal and informal learning processes.
The European guidelines for validating non-formal and informal learning developed by the European Centre for the Development of Vocational Training (CEDEFOP) are significant.

Four phases of validation

The wide orientation of validation, which is a prerequisite for capturing the complexity of individual learning, directly leads to the four-phase (stage) model introduced by the 2009 validation guidelines and the 2012 validation Recommendation. **These four phases of validation adapt the concept of validation to different contexts and different purposes:**

1. **Identification** - Validation starts with the identification of learning acquired and is where the individual becomes increasingly aware of prior achievements. This stage is crucial as learning outcomes differ from person to person and will have been acquired in various contexts: at home, in education, during work or through volunteering activities. For many, the discovery and increased awareness of one's own capabilities is, in itself, a valuable outcome of the process. Such identification might start comparing individual learning outcomes with a predefined template or exploring individual experiences. In this initial phase the individual must be made aware of the costs and benefits of validation.
   For the project SiT: The identification of acquired knowledge and skills, which were defined during WP2 in the Need Analysis and Training Structure Report. Based on the survey made by project partners, we have precisely defined two new job profiles, with their specifications, curriculum structure, required knowledge, skills, and key competencies.
2. **Documentation** - The documentation stage complements the identification stage by adding evidence and proof of acquired learning. This can be accomplished through the building of a portfolio that tends to include a CV and career-overview supported by various evidence types, ranging from written documents to work samples and demonstrations of practice. Ensuring this trust, and thus the portability of evidence, is crucial and requires coordination at regional, national and European level. Common formats for the presentation of learning experiences, as demonstrated by Europass, can aid this transfer and promote better understanding of these outcomes. Use of a common terminology, such as European skills, competences, qualifications and

occupations (ESCO), can help create better and easier-to-use documentation. ICT is also become increasingly important for the documentation of learning outcomes, enabling the creation and storing of online portfolios.

For the project SiT: Our documentation of learning outcomes will be accomplished via massive open online course (MOOC) designed and tailored specifically for the educational needs of the redefined professions in the TCLF sector. Registration is required to access the platform, which will provide us with basic information about the learner, which will be further used for online certification purposes. The digital certificate provided by the accredited company ICEP will constitute relevant and valid documentation and proof of learning outcomes achieved, recognizable throughout the EU.

3. **Assessment** - Assessment is normally referred to as the stage in which an individual's learning outcomes are compared against specific reference points and/or standards. It needs to be designed to capture and assess the learning specific to each individual, so various tools need to be considered. In some cases, written tests will be sufficient; in other cases, demonstrations, practical tests and evaluation of other forms of evidence will be required. Focusing on what a learner knows, understands and is able to do, a learning outcomes-based assessment is not limited to particular input factors. This makes it easier to reflect and respect individual variation in learning careers, accepting differences in how, where and when learning took place. To capture the complex range of learning involved, a combination of tools and methodologies may be required. The assessment stage is crucial to the overall credibility of validation of non-formal and informal learning. In some cases, certificates based on validation are perceived as inferior to those awarded by traditional courses and programmes; to counter such perceptions, tools and processes must be presented in as transparent a way as possible and must be linked to clear standards.

   For the project SiT: As part of the SiT project, we have designed a combination of tools and methodologies. The assessment will compare an individual's learning outcomes with specific reference standards. We have designed a set of short courses included in each module that will test the knowledge and information acquired during the course on the MOOC platform, which offer also an option to gain the shareable micro-credentials which are valid across the countries and a written test in the form of an online questionnaire on a secure certification platform. The overall credibility of the validation of non-formal and informal learning will be underpinned by a European certificate valid for five years, which will verify an individual´s learning outcomes.

4. **Certification** - The final phase of validation is about the certification - and the final valuing – of the learning which has been identified, documented, and assessed. This can take different forms but is commonly the award of a formal qualification (or a

partial-qualification or a smaller stand-alone part of a qualification). In certain areas (economic sectors and industries), certification may also involve issuing a licence allowing the individual to carry out specific tasks. In recent years we have observed a proliferation of different credentials - for example in the form of digital labels, microcredentials, vendor certificates and international qualifications. This emergence of alternative credentials may have important implications for validation in the years to come. The value - or the currency - of qualifications, certificates and credentials varies considerably and largely reflects the legitimacy of the awarding body or authority that certifies the learning outcomes. In many EU countries, validation is linked to national qualifications systems and is designed as an alternative path to well-known and established qualifications (Cedefop, 2020).

For the project SiT: Practically, the certification will be provided by impartial established qualification in EU countries by ICEP, who is accredited and validated according to the national system of Management System ISO/IEC 17024:2015 accredited by NAB for Auditor ISO 9001:2015 via secured and dedicated certification platform. If the testing requirements set out in accordance with international standards are successfully met, learners will be issued with a digital certificate of competence valid for five years, which is recognized by European Union countries.

In terms of processing personal data and authorization for use, ICEP as a Certification Body will apply the provisions of the Regulation (EU) 2016/679 of the European Parliament and of the Council, of 27 April 2016 “on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (**General Data Protection Regulation**)”.

Recommendations for the Recognition of the Project SiT Training and Learning Outcomes

These recommendations are part of a framework for certification, validation, recognition and accreditation designed and adapted for the specific aims and results of project SiT - Sustainability in TCLF. In the WP3 which was focused on the Curricula and modules development, project partners defined the **two blended training courses** for c-VET and HE learners (Bio-Textile Technician with EQF Level 5 and Textile Recycling Manager with EQF Level 6). By providing a blended training methodology, course outline, and adaptation strategy for the MOOC, the SiT training will be able to reach a wider range of learners and ensure that they are able to acquire the necessary skills and knowledge, and the training is tailored to the needs of different learners.

Recommendations for the assessment of different training methods as parts of the project SiT training:

- **E-learning -** Development and design of the open-source MOOC platform with a direct link to online certification exam via ICEP's secured dedicated certification platform: https://competenceinstitute.com/. Successful learners will be awarded during the course on MOOC platform with micro-credentials - recognized as shareable digital badges and with a digital certificate of competences valid for 5 years and recognized by countries in the European Union after the successful completion of the certification exam. The certification exam for the SiT project will be prepared for both new professional profiles - Bio-Textile Technician and Textile Recycling Manager. **All project partners agreed to these requirements set for online certification exam for SiT learners and trainers in the TCLF sector:**
  - The certification exam will be in the form of a multiple-choice questionnaire. Each question will have 4 answers, where 1 is correct and 2 are incorrect.
  - The certification exam will contain 40 questions chosen randomly by the certification platform from the 80 questions collected in the question bank (10 questions per each learning module).
  - The level for passing the certification exam is 70% of correct answers (28 correct answers from a total of 40 questions).
  - The overall time for one attempt will be set for 45 minutes.
  - Each candidate will have 3 attempts to pass the certification exam.
  - The platform will release the digital certificate automatically after the successful completion of the certification exam and it will be sent to the email address of learners provided during the registration process on the ICEP certification platform.

- **Face-2-Face** - For this part, local evaluation committees of at least 3 members of each project partner country, who should possess expertise in the subjects related to the 2 professional profiles, will be established to validate and assess candidates and learners. Successful learners will be awarded with a certificate of successful completion of this phase of training, verified and approved by the ICEP as an impartial accreditation and certification body.
- **Project-based learning & Work-based learning** - Similar to the previous phase of training, we will apply the evaluation approach chosen by individual project partners who will represent their countries. This may take the form of evaluation committees, workshops, conferences, study visits, self-development of a research project, national piloting plans etc. depending on each project partner's preferences and good practices. Successful learners will be awarded with a certificate of successful completion of this phase of training, verified and approved by the ICEP as an impartial accreditation and certification body.

Recommendations for the assessment of micro-credentials of the project SiT training:

- **Micro-credentials** are digital badges that represent specific skills or knowledge a person has acquired. They are often offered by universities, training providers, or professional associations and can be earned through various forms of training, such as online courses, workshops, or practical assessments.
- To create a micro-credential, first, the specific skill or knowledge needs to be defined and broken down into measurable competencies. Then, the assessment criteria for each competency should be established, as well as the criteria for earning the badge. This can be done by consulting with subject matter experts and industry stakeholders. To recognize micro-credentials, a digital badge can be created that contains metadata describing the credential, such as **the issuing organisation, the competencies it represents, and the criteria for earning it**. This metadata can be **shared online and verified by third-party platforms**, such as LinkedIn or Mozilla Backpack, which allow the owner to display their credential and its metadata to potential employers or colleagues.
- SiT partnership has agreed that in the project Pilot case the micro credentials will be implemented in the format of the digital badges that will be released automatically via MOOC platform after every learning module as an achievement, to motivate the participants and offer them a shareable way to show their progress. The online certification will be offered at the end of the whole course as an assessment tool to verify all knowledge and skills they have learned and improved throughout the whole course consisting of all learning modules, and then verify them through an

international examination and European certificate.

- **For the SiT project training and our purposes we will follow the document "A European Approach to Micro-credentials"** printed by the European Union: The European approach to micro-credentials offers a common definition that is valid across sectors of education and the world of work and mirrors the societal mission of education and training institutions, including higher and vocational education and training (VET) institutions, and nonformal providers as well as employers and labour market actors.
- A micro-credential is the record of the learning outcomes that a learner has acquired following a small volume of learning. These learning outcomes have been assessed against transparent and clearly defined standards. Courses leading to micro-credentials are designed to provide the learner with specific knowledge, skills and competences that respond to societal, personal, cultural or labour market needs. Micro-credentials are owned by the learner, can be shared and are portable.
- Each digital badge will contain metadata describing the credential, such as: title of the micro-credential, awarding body, country of the issuer, date of issuing, learning outcomes, level of the learning, type of quality assurance used to underpin the micro-credential.

However, due to the inconsistent factual and developmental situation at European and national level (none of the partner countries has a nationally applied and accepted MC model), it is not possible for us to develop a practicable concept for all partners. The necessary standardised European or national guidelines and frameworks do not exist.

Co-funded by the European Union

Example of digital badges made by ICEP

Example of Digital Certificate made by ICEP

Certificate of Competence

After successfully passing the exam in date 18/05/23 with score 100.00/30

We declare that

Adelaida Fanfarova

Has been certified as

Bio-Textile Technician (EQF Level 5)

The verification of the skills acquired in the training course took place through the administration of a tests with multiple responses concerning all the issues addressed in the training program.

Registration Number: 23-0000456 Date of original registration: 18/05/23 Valid for five years

Bratislava - SK, 18 May 2023

ICEP CEO

Certificate of Competence

After successfully passing the exam in date 18/05/23 with score 100.00/30

We declare that

Adelaida Fanfarova

Has been certified as

Textile Recycling Manager (EQF Level 6)

The verification of the skills acquired in the training course took place through the administration of a tests with multiple responses concerning all the issues addressed in the training program.

Registration Number: 23-0000456 Date of original registration: 18/05/23 Valid for five years

Bratislava - SK, 18 May 2023

ICEP CEO

Conclusion

Development of validation of non-formal and informal learning and of national qualifications frameworks (NQFs) share a common objective: enabling individuals to make progress in their learning careers based on learning outcomes achieved, not on duration and location of a particular learning programme.

The concept of a national qualifications system is now widely understood as all aspects of a country's activity that result in the recognition of learning in Europe. These systems include the means of developing and operationalising national or regional policies on qualifications, institutional arrangements, quality assurance processes, assessment and awarding processes, skills recognition and other mechanisms that link education and training to the labour market and civil society.

Most importantly, validation gives practical support to progression between different levels and types of education and training. Integration of validation into the national qualification system requires that qualifications are opened up to a broader set of learning pathways and that validation arrangements are established as an accepted and normal route to a certificate or qualification. This requires a shift to learning outcomes. An objective shared by most NQFs is a better relationship between different qualifications, aiding progression. This can be accomplished by reducing barriers to transfer and accumulation of learning achievements. Methods and systems for validating non-formal and informal learning, focusing on what has been achieved, contribute directly to this objective.

The use of ICT in validation might be a game changer for possible approaches to identifying, documenting, assessing and certifying competences. The spread of ICT systems allows for easier establishment of database repositories of learners and their knowledge, and competences achieved. Centralised registries can collect information from an individual in all their learning experiences and learning achieved. This information might be more transferable through inter-operability options that allow ICT systems to speak to each other. Digital formats for certificates can hold a large amount of information, which can be more detailed and exhaustive, making the certificate more transparent and providing more information to the reader of the certificate.

Basic terms and definitions

Certification: The action or process of providing someone with an official document attesting to a status or level of achievement. The certification of learning outcomes is the

process "... of formally attesting that knowledge, skills and competences acquired by an individual have been assessed and validated by a competent body against a predefined standard. Certification results in the issue of a certificate, diploma or title".

Certification of competence: Attests that the certified professional or individual has proved to be in possession of the knowledge, skills, personal attributes and qualifications required for certification.

Protocol: Descriptive procedural document containing the guidelines to validate and certify the competences acquired via the tools developed in the project.

Identification and Document Verification: Identifying non-formal and informal learning is a process that "... records and makes the individual's learning outcomes visible. This learning process does not result in a formal certificate or diploma, but it may provide the basis for such formal recognition."

Non-formal learning: The education that occurs outside of a formal learning classroom setting. Although non-formal education takes place outside of formal classroom settings, learners receive a well-structured and well-planned educational program. Non-formal education provides learners with the opportunity to develop different skills and abilities.

Lifelong Learning: Lifelong learning is the "ongoing, voluntary, and self-motivated" pursuit of knowledge for either personal or professional reasons.

Sectoral Validation: A specific validation process tailored to the needs of different sectors or industries, ensuring that the recognition of competences aligns with the specific requirements of each sector.

Micro-credentials: Recognition of specific skills or knowledge a person has acquired represented with a digital badges. They are often offered by universities, training providers, or professional associations and can be earned through various forms of training, such as online courses, workshops, or practical assessments.

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