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GUIDELINES FOR FUTURE CURRICULA IN OTHER MANUFACTURING SECTORS

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Project Partners

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- P2 TECHNICAL UNIVERSITY OF IASI TUIASI (Romania)
- P3 ECORES SPRL ECORES (Belgium)
- P4 AGRUPACION EMPRESARIAL INNOVADORA DE FABRICANTES DE MUEBLES Y AFINES DE LA REGION DE MURCIA- AMUEBLA (Spain)
- P5 CENTRO TECNOLOGICO DE CALCADO DE PORTUGAL CTCP (Portugal)
- P6 TEXTILE TRADE ASSOCIATION TEXTILE CLUSTER TTA-TC (Macedonia)





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1. RATIONAL OF THE OUTPUT

The activity "Development of the guidelines for future curricula in other manufacturing sectors" besides textile and fashion sectors - Activity IO2-A5 - finds its framework within Output 2 - Joint Curriculum in eco-design in manufacturing sectors related with textile and clothing - and aims at preparing guidelines to support the design of future curricula for other manufacturing sectors besides textile and fashion, using the knowhow and results developed in Design4Cirle project, more specifically the curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES.

In addition, the task goes further with the suggestion of learning strategies for future training paths, in other sectors. This document is an annex of Design4Circle Joint Curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES with aiming at facilitating its future transferability.

It is generally proved within project activities that the basic concepts related to eco-design and circular economy are totally applied to other manufacturing sectors. At this point, this statement is supported by the validation of curriculum done in other two sectors, besides textile and clothes, namely footwear and leather goods and furniture and upholstery. These two sectors were represented by partners CTCP (CENTRO TECNOLÓGICO DO CALÇADO DE PORTUGAL) and AMUEBLA (AGRUPACION EMPRESARIAL INNOVADORA DE FABRICANTES DE MUEBLES Y AFINES DE LA REGION DE MURCIA) correspondently, who tested and validated the curriculum within their stakeholders' panels and near the companies and students/trainees.

The concepts on eco-design and circular economy are transversally treated in at least 2 modules, totally adapted to both sectors mentioned above: Module 1 - Introduction to Circular Economy Module 7 - Business management in a Circular Economy

A more sectorial approach to fashion industry is given in the following modules and with a certain adaptability, they also fit the training needs of several sectors of activity dealing with circularity and sustainability issues as challenges. Those modules are specifically:





Module 2 - Sustainability challenges in textile and fashion industry Module 3 - Materials for a circular economy Module 4 - Design for a Circular Economy

But the other 2 modules of the Design4Circle curriculum, out of 7, Module 5 - Manufacture for a circular economy Module 6 - Recycling technologies for a circular economy in a textile and fashion industry and their specific topics developed within the curriculum may be adequate to other sectors, as they are being to Footwear and Leather Goods and Furniture and Upholstery, if they are adapted to their specific needs and include specific sectorial approaches.

The objective of this Output is to diverge from the actual developed Joint Curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES, prepared to textile and fashion cluster, to other industries.

Therefore, let us find out how it can be issued and, more important, how new curricula may be designed taking Design4Circle curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES as a common ground.





2. FRAMEWORK

Regarding the EU market, in 2016 the EU was the major markets for clothing, accounting for 37,4% of world imports, being the second world top textile exporter. The European Commission estimates that the EU textile industry generates waste at 16 million tons per year. Thereby, it is obvious the necessity to move away from the current linear model to a new circular textile model.

In this direction, the textile and fashion sector design is a key step to produce the transition to a circular model. However other clusters are also responsible for high levels of wastes generates and maybe also important keys to contribute to circular model of production, namely footwear, leather, furniture and upholstery, already contemplated in the Design4Circle project, but many others more.

European Commission is committed to place eco-design principles at the heart of the EU's sustainable product policy. The list of Key Product Value Chains, outlined in the Circular Economy Action Plan already released, correctly prioritises the high environmental impact sectors where specific actions are needed. Only with ambitious laws and targets, however, can these sectors truly become more circular.

Eco-design principles were extended to a broader range of sectors, including those which have so far escaped dedicated environmental laws such as batteries, plastics, construction, among others

The Circular Economy Action Plan seeks to introduce a policy framework that can mainstream more sustainable production and consumption, without compromising the Earth's carrying capacity.

Around 80% of a product's environmental impact is locked in at design stage. So design is strategical to achieve circular sectors, taking into account that "designing and producing higher quality products and providing access to them via new business models will contribute to a better".

In addition, the Commission pointed that "Eco-design supports the Commission's overarching priority to strengthen Europe's competitiveness

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and boost job creation and economic growth; it ensures a level playing field in the internal market, drives investment and innovation in a sustainable manner, and saves money for consumers while reducing CO2 emissions". Consequently, it will be necessary to prepare current and future designers with the necessary skills on circular design or ecodesign.

Likewise, the Commission in its Action plan for the Circular economy points that "the transition to a circular economy will also require a qualified workforce with specific and sometimes new skills. If the right skills at all levels are to be developed, they will have to be espoused by the education and training systems". In the same way, the Commission is also following up on its Green Employment Initiative with action to anticipate needs and encourage the development of skills to support job creation. For that reason, Design4Circle aims to cover the skill gaps in eco-innovation of European Designers in textile and fashion products.

2.1. FOCUS ON THE PROJECT OBJECTIVES

he guidelines to design curricula in eco-design and circular economy for other sectors of activity besides textile and fashion sector, takes Design4circle results as starting point, proposing a simplified methodology of drafting curricula on topics eco-design and EC related, with the work and lessons learnt from D4C and by the partnership.

In fact, Design4Circle created an innovative learning curriculum in line with the needs of designers of the textile and fashion industry towards a circular business model, but now it goes further in its objectives, proposing:

- To match needs and resources on eco-design to other sectors of activity besides textile and fashion towards a circular model and current best practices on circular businesses.
- To widen the sectorial scope of the joint curriculum (JCV) on ecodesign and circular economy to other sectors also responsible for environment and social impact and dealing with sustainability and circularity issues, with design as a common ground to evolve to contribute to a better world.

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- To break borderlines among business sectors in general and experts in eco-design and circular economy in many other sectors than textile and fashion.
- To prepare European designers with the broader skills and knowledge for eco-design in a circular model. It will be performed by promoting better anticipation of green and creativity skills needs and developing better matching between skills and companies' needs in more sectors than textile and fashion.
- To create new job opportunities for people with skills in the new area of eco-design, and promoting eco-efficient materials, in a wide sense.
- To boost new businesses in other sectors fulfilling the principles of the circular economy.

2.2. FOCUS ON PROJECT RESULTS

These guidelines are both based and a complement of the following project results:

- An analysis of last resources available and needs for eco-design and current best practices in the textile sector, now extended to other sectors, meaning to develop a complete analysis on best practices, last resource available and needs on eco-design for a circular industry in general.
- A Joint Curriculum (JCV) in ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES, defined necessary learning outcomes, methodology and Joint Curriculum Structure to cover previous identified gaps, which now will be transfer to other sectors besides textile and fashion.

2.3. FOCUS ON PROJECT TARGET-GROUPS

The main beneficiaries of this transferability effort of the Joint Curriculum (JCV) in ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES are designers and workers of other industries and students of industrial design, such as footwear, furniture/upholstery as it was already tested and validated in IO2-A4, and many others that have eco-design and circular economy as a passport to innovate and become more competitive in a more sustainable and circular world.





3. DEVELOP A CURRICULUM ON ECO-DESIGN AND CIRCULAR ECONOMY

These guidelines to design curricula in eco-design and circular economy for other sectors than textiles and fashion, taking Design4Circle Joint Curriculum as starting point, proposes a simplified methodology of drafting curricula in these topics with the already developed results and lessons learnt from D4C and by the partnership.

The idea here is to guide institutions, VET providers, Universities in drafting a curriculum on eco-design and circular economy but not from the scratch, but changing, instead, the normal order of the methodology of designing curricula into a more efficient and effective methodology grounded on D4C project results and always focusing on the analysis of Learning Outcomes.

3.1. THE NORMAL CURRICULA DESIGN FLOW

The normal flow-chart for curricula design in a given sector, to a given target-group and within a given topic, according to EQF (European Qualification Framework) and the presuppositions of Learning Outcomes (LO), bridging to ECVET (European Credit Transfer for Vocational Education Training) and to EQAVET (European Quality Assurance for Vocational Education Training) is composed by 8 to 10 steps, depending on the details of the methodology. This was applied to Design4Circle partners to design Joint Curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES

The normal flow-chart for curricula design is composed by the following steps:

- 1. Analysis of the professional profile a set of activities that the new professional should do in the frame of the new activity.
- 2. Identification of training needs on a certain topic and to which the curriculum is addressed to. This can be done through consultation to target-group and desk research on forecasting data. In Design4Circle, this training needs were validated within workshops targeted to stakeholders' panels in each country involved.





- 3. Identification of Learning Outcomes (LO) for each activity area, this step involves the identification the Learning Outcomes - what a learner is expected to know, to be able to do and to understand at the end of a learning process or sequence. The way such outcomes are defined and written orients teaching and learning and influences the quality and relevance of education and training. The way learning outcomes are defined and written, matters to individual learners, the labour market and society in general. D4C produced a wide range of materials to support the draft of curricula focused on CE and ecodesign topic that can be used for other sectors.
- 4. Apply KSA approach Identification, for each Learning Outcome of Knowledge areas, Skills to achieve at the end of the training and level of Autonomy and Responsibility, through KSA method:
 - a. Knowledge means the body of facts, principles, theories and practices that is related to a field of work or study. It is described as theoretical and/or factual knowledge.
 - b. Skill means the ability to apply knowledge and to use knowhow to complete tasks and solve problems. They are described as cognitive (logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments)
 - c. Autonomy and responsibility refers to the capacity to make decisions independently or in a team and carry out a plan, the scope of practice and individual expertise, being accountable for decisions made and actions taken, when working individually or in a work team.
- 5. Structure of training modules/units Identification, for each set of KSA, of the correspondent training module/unit and submodules/subunits that will lead the trainee/student to achieve the Learning Outcome, correspondent learning strategies and assessment means. Normally this is supported by filling in the content development tools with all information regarding identification of the units of learning outcomes, designing the content of each unit, attribution of a time load to each content depending on the training methodology (lectures/lessons, demonstrations, case studies, workbased projects, etc.), defining assessments and certification requirements.





- 6. **Definition of course duration** For each Learning Outcome, define the number of hours for the learning process, divided namely into training, self-study, practical activities.
- 7. Bridging the training programme to ECVET, EQF, and EQAVET, applying EQF rules and analysis of the specification at national level if any, besides the EQF (European Qualification Framework)
- Revising the training programme according to the development of the occupational profile regarding validation of the professional competencies by national regulatory bodies.
- 9. Validation of the training programme near stakeholders' panel. In Design4Cirle this was done in IO2-A4 in each country through a dedicated survey.

Below the flow-chat that illustrates the methodology for curriculum design in Design4Circle project



Picture 1 - flow-chart of curriculum design traditional process

The proposal of Design4Circle is to draft a curriculum on eco-design and circular economy the way around, through reverse engineering approach, starting from the Final Joint Curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES, changing the normal order of the methodology of designing curricula, adapting step by step the small conquests of the normal steps into a new scheme that should respect in the same way the training needs of the new sector.

3.2. REVERSE ENGINEERING APPLIED TO CURRICULA DESIGN

What is reverse engineering and how can be applied to curriculum design? Reverse engineering, also called back engineering, is a method of industrial engineering in which one begins with a known finished product





and works backward to reveal the processes and specifications involved in the product's development and manufacture. The "secret" is to disassemble and examine or analyse in detail the product - the result - to discover the concepts involved in manufacture usually in order to produce something similar.

In other words, reverse engineering is taking apart an object to see how it works in order to duplicate or enhance the object. The practice, taken from older industries, is now frequently used on creative industries and sectors and more and more open its scope to social and educational sciences.

Reverse engineering, applied to curriculum design, an innovative application of the reverse engineering concept, is a process of the final curriculum achieved deconstructing through а common/normal/traditional process described in the past section, to retrieve design information, and adapt to similar training needs, in order to set up similar learning outcomes, as a basis of similar modules and units description.

The use of reverse engineering in curriculum design offers numerous benefits in the recreation and improvement of already existing curricula. The following are only some of these benefits:

- Bringing in more efficient, less expensive results into the EQF, for a specific situation, dedicated to eco-design and circularity in this case taking as the starting point the curriculum dedicated to textile and fashion sectors.
- Fostering innovation in curriculum designers' specialists. They can deconstruct a curriculum and create a less expensive but more efficient version of it, customized to other situations.
- Discovering curriculum vulnerabilities and promote the continuous improvement of all project results.
- Exploring already existing curricula that can fit different needs and situations, normally similar to those presented in the start of the initial process.
- Saving money and resources.
- Reverse engineering is a more affordable choice because it takes a shorter time to bring a product to the market. It helps analyse a product in its parts so manufacturers can recreate it at a lesser





cost. This is the key-benefit to apply this methodology to curricula design and the Design4Cicrle project piloted it and is reporting it in this document.

3.3. THE 6 STEPS METHODOLOGY ON FUTURE CURRICULA DESIGN ON ECO-DESIGN AND CIRCULARITY

Here we propose a simplified method taking as common ground the already drafted curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES.

Globally the methodology suggests to start by IO2 - curriculum defined, structured, oriented to different target groups, to analyse it in all each knowledge, skills, attitudes thinking about the news sector to which the curriculum will be adapted, to decide for each module/unit on the need of implement changes, to validate the new training needs (for the news sector), search for additional data/knowledge to improve the modules/units, to draft the new curriculum and finally to validate it near the sector representatives. This 6 steps methodology is illustrated in the following scheme:



Picture 2 - Flow-chart of 6 steps methodology curriculum design

In the next sections, every step will be detailed.

Here some terminology to take into consideration:

D4C Joint Curriculum - Design4Circle curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES.

New sector - the sector to which the curriculum is being adapted/transfered





STEP 1- ANALYSIS OF THE D4C JOINT CURRICULUM

This is the first step of the 6 steps methodology that proposes to start with the analysis of the already drafted curriculum, focused on the learning outcomes, detailed into knowledge, skills, autonomy, and responsibility and to decide on the need of change and /or adapt its elements in order to better fit the perceived training needs of the new target-group, new sector. This analysis, which, again, should focus on the Learning Outcomes (LO), meaning the set of what a learner is expected to know, to be able to do and to understand at the end of a learning process or sequence, being able to act with the needed autonomy and responsibility. This analysis is the key to the success of this methodology, the capability to project the already existing curriculum into a new sector. The objective here is also to detect new training needs the new target groups in the new sector have and how far the curriculum is able to overcome. The finalization of this step 1 involves the answer to the question if it's mandatory to implement changes and in which modules and units.

STEP 2- VALIDATION OF THE PROJECTED TRAINING NEWS

The adaptation of a curriculum to a new sector of activity, maintaining the scope and topics, obliges a validation of the training needs. In this methodology, step 1 identifies new training needs that need to be validated by the new sector representative stakeholders in step 2. The validation can be implemented through focus groups within dedicated workshops as it was done in Design4Circle project, in the several countries involved. VET providers Universities and other entities in the field of VET can find inspiration in Design4Circle practices.

STEP 3- RESEARCH PHASE, ADDITIONAL RESOURCES ASSIGNMENT

In this step the proposal is to analyse the need of additional resources, to decide the need to tackle a research to gather information to improve the existing curriculum in the direction of the new sector needs. This is the phase to research, to learn, to gather theoretical and practical knowledge, to apply to the new curriculum.





STEP 4- ADAPT LEARNING OUTCOMES, MODULES, UNITS

This is the step where the curriculum is modified to match the new needs, the demands of the new sector of activity. This is more the operational phase of the curriculum design, where the adaptation is materialized into tangible changes in the LOs, Modules and Units. A new curriculum is being drafted here according to sectorial data gathered in step 3, matching training needs validated in step 2.

The result is a new curriculum, conceptually similar to the Design4Circle joint curriculum, on eco-design and circularity modified to be more in line with the specificities of the new sector in consideration. The new curriculum will have finetuned LOs, Modules and Units.

STEP 5- VERIFICATION OF EQF PRESUPPOSITIONS, ECVET AND EQAVET

In this step, the new curriculum will be compared to the Design4Circle already existing one, in its terms of duration (learning and self-study hours of duration), EQF level, ECVET points and EQAVET indicators fulfilment, that should be similar to the already existing one.

STEP 6- VALIDATION OF THE FINAL CURRICULUM

In this step, the new curriculum will be validated near the stakeholders' panel. For the validation we suggest to apply a Quantitative method through a survey among SMEs, business associations, that can represent the new sector into which the new curriculum has been adapted, envisaging at collecting general opinions. IN addition, we suggest to apply a Quality method through interviews with key experts within the new sector envisaging to get in-deep considerations regarding the new adapted curriculum. We suggest getting inspiration in the IO2-A4 activity of Design4Circle and eventually to use available templates.





3.4. THE SUPPORTING TOOLS

As supporting tool this document includes a Template of a orientative table which includes the 6 steps and help to follow them in a correct sequence.

DESIGN	IGN4CIRCLE CURRICULUM STEP 1 STEP 2 STEP STEP 4 3						STEP 5	STEP 6			
D4C Modules	D4C Units	D4C Learning Outcomes	Number of hours / ECVET	Need changes LO/modules/ units?	Need prior validation of training needs?	Need research? Additional resource?	LO in news sector	Modules for new sector	Units news sector	Number of hours / ECVET in new sector	Final Validation in new sector
Mod. 1	1.1										
Mod. 2	, , ,										
Mod. 3											

In addition, a template for curriculum validation survey is also available, for step 6.

SUGGESTED QUESTIONS

1. the curriculum addressed the needs of sector X companies to implement the necessary changes for a transition to a circular economy

a)	Greatly address the needs	
b)	Somewhat address the needs	
C)	Partially address the needs	
d)	Does not address the needs	

Why?:

2. Perceived benefits of the new curriculum

	Strongl y agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Curriculum is essential to the SMEs					
SMEs will acquire the necessary knowledge on					





how to work towards a circular economy			
Curriculum will increase HR excellence and advance distance			
learning opportunities			
Curriculum will facilitate the implementation of sustainable practices in your sector and new green products			
The Curriculum will encourage new business opportunities			
The curriculum outlines the necessary Knowledge, skills and autonomy/responsibilit y level towards a circular industry			

3. 1 to 5 ranking (with 5 being the highest) of the need and interest for your sector on each of the defined modules

	1	2	3	4	5
Module 1. Introduction to circular					
economy					
Module 2					
Module 3					

4. Do you miss any **main** topic that it is not addressed in the Joint Curriculum?



In case of "YES", what topic do you consider is not
 addressed? _____

5. 1 to 5 ranking (with 5 being the highest) of the need and interest for your sector on each of the defined units.

	1	2	3	4	5
1.1 Introduction to circular economy					
1.2					
1.3					
	1	2	3	4	5
2.1					
	1	2	3	4	5





6. Do you miss any **specific** topic that it is not addressed in the defined Curriculum?



In case of "YES", what topic do you consider is not addressed?

7. Do you consider the curriculum offers understandable and enough information regarding eco-design and eco-innovation principles for your sector?

Yes	
No	

In case of "NO", what should we add or change?

8. How do you consider the duration of the modules/Units?

Enough	
More than enough	
Not enough	

Please give recommendation for total duration .

9. Any further comment:

More questions in IO1-A4 to inspirations





4. EXAMPLES OF CURRICULA FOR DIFFERENT SECTORS

In this section, 2 examples of the implementation of the 6 steps methodology to design curricula on the basis of D4C curriculum are presented, one for Footwear and Leather Goods, another one for Furniture/Upholstery.

These 2 examples are indeed a piloting of the 6 steps methodology proposed, as the D4C curriculum is targeted to textile and fashion, of course with intersections with many other sectors as we will see afterwards.

The reason for selection of theses 2 sectors of activities is the involvement of the partners CTCP and AMUEBLA in the project who are dedicated to the correspondent above mentioned sectors.

AGRUPACION EMPRESARIAL INNOVADORA DE FABRICANTES DE MUEBLES Y AFINES DE LA REGION DE MURCIA (AMUEBLA) - <u>www.amueblacooperacion.es</u> - Spain: addresses needs in the furniture and habitat sector, especially of the upholstery sector.

CENTRO TECNOLÓGICO DO CALÇADO DE PORTUGAL (**CTCP**) - <u>www.ctcp.pt</u> - Portugal: supports all Portuguese Footwear cluster companies, it's specialized in Footwear and Leather Goods technology which includes the sustainability and circular economy framework.

4.1. FOOTWEAR AND LEATHER GOODS

Footwear production worldwide reached 24.2 billion pairs in 2018, growing by 2.7% on the previous year. Footwear and fashion leather accessories are two subsectors of the fashion cluster, that continues growing steadily in Europe. Europe is responsible for the production of 3,3% of worldwide footwear production, employing more than 278.000 people in more than 21.000 companies, mainly SMEs, adopting a development strategy based on higher quality of products and services, flexibility, short time to market, product differentiation and added value. The consumption will continue its growth pattern thanks to the increase of population, longer life





expectancy, and consistent improvements in earning power. Europe achieved 15,2% share regarding consumption worldwide.

Regarding the fashion leather accessories, it covers a wide range of items such as all kinds of handbags, luggage and other travel goods, flat or small items (e.g., purses, wallets), belts, etc. Europe has been one of the most important manufacturers of leather goods, with the focus on the high-end/luxury segment. This industry is very much connected to Footwear industry, more and more due to the concept of total look. It's integrated in the cluster of fashion.

The Footwear and accessories subsectors are responsible for a great quantity of final wastes placed in landfills without any treatment. The small and medium-sized dimension of companies difficult the use of optimized solutions to reach the objective of climate neutrality in the second half of the twenty-first century.

In fact, the scale of the opportunity is very large due to the size of the fashion industry.

But the SMEs are also responsible for the production of very sophisticated and luxurious articles which enlarge the durability and product life cycle, a step forwards the limitation of negative environmental impacts. Even though companies in the EU tend to respect the highest requirements in terms of human and social rights, safety for consumers and environmental protection, they still can play an important role to facilitate the transition to more sustainable production and services in the fashion industry.

4.2. FURNITURE / UPHOLSTERY

The furniture industry is a labour-intensive and dynamic sector dominated by small and medium-sized enterprises (SMEs) and micro firms. EU furniture manufacturers have a good reputation worldwide thanks to their creative capacity for new designs and responsiveness to new demands. The industry is able to combine new technologies and innovation with cultural heritage and style, and provides jobs for highly skilled workers.

The sector employs around 1 million workers in 130 thousand companies generating an annual turnover of around EUR 96 billion. About 12% of designs registered in the European Union Intellectual Property Office





relate to this sector. The EU is a world leader in the high-end segment of the furniture market. Nearly two out of every three high-end furniture products sold in the world are produced in the EU.

The EU furniture sector faces enormous competition from countries having low production costs. China's penetration into the EU market is growing rapidly and it is now the largest furniture exporter to the EU, accounting for over half of total furniture imports to the EU.

The reliance on innovation and design combined with an increase in global trade and digitalisation, makes the sector more vulnerable to weak protection of intellectual property rights. Boosting research and innovation also requires finance that is often inaccessible to SMEs.

The ageing workforce combined with difficulties in attracting young workers may lead to disruptions in maintaining skilled workers and craftsmanship.

The EU furniture sector has undergone significant changes to make it more export-oriented and to focus on upgrading quality, design, and innovation. These changes include restructuring, technological advances, and business model innovations.

The main opportunities ahead lie in Investment in skills, design, creativity, approach to eco-design and circularity, research, innovation, new technologies, new business models and supplier-consumer and relationships, research in advanced manufacturing technologies, access to new markets and synergies - with construction and tourism could also be sector's excellent track record building exploited, on the in sustainability. Specifically, the reliance on raw materials from sustainable sources used in the furniture production could have a positive impact on sales among environmentally concerned end-users.

In the next pages, the exercise of adaptation of the Design4Circle curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES into a Footwear and Leather Goods (accessories) and Furniture/Upholstery are included.

4.3. IMPLEMENTATION OF THE 6 STEPS METHODOLOGY FOR CREATING A CURRICULUM ON ECO-DESIGN AND CIRCULARITY IN

FOOTWEAR AND LEATHER GOODS

D4C Modules	D4C Units	D4C Learning Outcomes	Number of hours / ECVET	Need changes LO/modules/ units?	Need prior validation of training needs?	Need research? Additional resource?	LO Footwear & LG	Modules for Footwear and LG	Units Footwear and LG	Number of hours / ECVET	Final Validation
1. Introduction to circular economy	1.1 Introduction to circular economy1.2 Concepts and principles of a circular economy1.3 Policies supporting Circular Economy	<pre>By the end of this course, the learners will be able to understand: • the purpose of Circular Economy (CE) • how to apply the principles of CE management • the limits of the current linear economy • the benefits of CE • the concept of CE (its historic development, its definitions, its principles) • the current barriers associated with CE • the requisites for the implementation of CE • the position of CE within the sustainable development concept.</pre>	Learning hours: 6 Self-study hours: 6 ECVET: 2	NO	NO - already articulated in validation workshops	NO	<pre>By the end of this course, the learners will be able to understand: • the purpose of Circular Economy (CE) • how to apply the principles of CE management • the limits of the current linear economy • the benefits of CE • the concept of CE (its historic development, its definitions, its principles) • the current barriers associated with CE • the requisites for the implementation of CE • the position of CE within the sustainable development concept.</pre>	1. Introduction to circular economy	1.1 Introduction to circular economy1.2 Concepts and principles of a circular economy1.3 Policies supporting Circular Economy	Learning hours: 6 Self-study hours: 6 ECVET: 2	NO need. It's validated in IO2-A4
2. Sustainability challenges in the textile and Fashion industry	 2.1 Alarming trends in textile and leather industry in terms of waste and environmental issues and social impact 2.2 People health and safety 2.3 Waste, package and environmental footprint according to the national and EU regulations 2.4 Ethical production 	By the end of this course, the learners will be able to understand: the existing situation and challenges in textile industry EU and worldwide the natural and technical cycles of matter and energy the impact of CE to people health and safety how to supervise the environmental practices of the company in order to comply with the national and EU regulations how to apply critical success actions and best practices in CSR on key topics how to optimize the use of resources by circulating products and materials 	Learning hours: 10 Self-study hours: 10 ECVET: 4	YES Widen the scope of unit 2.1 to include footwear and leather goods industry.	NO Validation of good practices in footwear and LG industry (leather industry is already approached) In D4C project it was made during workshop (workshop with stakeholders)	YES Alarming practices in Footwear and Leather industry on environmental and social impact	 By the end of this course, the learners will understand the existing situation and challenges in Footwear and Leather Goods industry EU and worldwide the natural and technical cycles of matter and energy the impact of CE to people health and safety how to supervise the environmental practices of the footwear and Leather Goods companies in order to comply with the national and EU regulations how to apply critical success actions and best practices in CSR on key topics how to optimize the use of resources by circulating products and materials 	2. Sustainability challenges in the Footwear and Leather Goods industry	 2.1 Alarming trends in footwear and leather industry in terms of waste and environmental issues and social impact 2.2 People health and safety 2.3 Waste, package and environmental footprint according to the national and EU regulations 2.4 Ethical production 	Learning hours: 10 Self-study hours: 10 ECVET: 4	NO need. It's validated in IO2-A4
3. Materials for a circular economy	 3.1 Sustainable textile and non-textile materials 3.1.1 Sustainable natural (cotton, bast, wool, silk) fibre production 3.1.2 Sustainable production of regenerated cellulosic fibres 3.1.3 Sustainable synthetic fibre production 3.1.4. Sustainable chemical technologies for textile 3.1.5 Low impact materials non textile materials (for example leather, Seacell, Chitosan or Chitin, Corkshell, Milk protein, etc.) 3.2 Textile waste as raw material for upcycling 3.2.1 Garment production waste materials 	 By the end of this course, the learners will be able to: take decisions on the applicability of certain materials based on their ecological potential select suppliers of materials and components with ecological characteristics demonstrate the spirit of creative reuse of recyclable materials how to analyse recoverable materials design, plan and develop materials that can be later reused how to manufacture products from recoverable materials how to formulate recycling and manufacturing habits of reusable material products 	Learning hours: 10 Self-study hours: 10 ECVET: 4	YES To include approach to sustainable leather, Eco leather and others, leather and footwear wates as raw material for upcycling Change approach on Unit 3.2 for footwear and LG Unit 3.3 will be optional	NO Validation of needs on sustainable leather, Eco leather and others, leather and footwear wates as raw material for upcycling In D4C project it was made during workshop (workshop with stakeholders)	YES Sustainable leather, Eco leather and others footwear related materials Footwear and leather wastes	By the end of this course, the learners will be able to: take decisions on the applicability of certain materials based on their ecological potential select suppliers of materials and components with ecological characteristics demonstrate the spirit of creative reuse of recyclable materials how to analyse recoverable materials design, plan and develop materials that can be later reused how to manufacture products from recoverable materials how to formulate recycling and manufacturing habits of reusable material products how to form models on extending the lifecycle of products and keeping 	3. Materials for a circular economy	 3.1 Sustainable textile and non-textile materials 3.1.1 Sustainable natural (cotton, bast, wool, silk) fibre production 3.1.2 Sustainable production of regenerated cellulosic fibres 3.1.3 Sustainable synthetic fibre production 3.1.4. Sustainable chemical technologies for textile 3.1.5 Low impact materials non textile materials (for example leather, Seacell, Chitosan or Chitin, Corkshell, Milk protein, etc.) 3.1.6 Sustainable leather, Eco leather and others footwear related materials 3.2 Footwear and Leather waste as raw material for upcycling 3.2.1 Footwear and LG (accessories) production waste materials 	Learning hours: 10 Self-study hours: 10 ECVET: 4	NO need. It's validated in IO2-A4





	 3.2.2 Reuse of already worn garment materials 3.3 Recycled textiles 3.3.1 Recycled fibre 3.2. Recycled fibre yarn, woven and knitted fabrics 3.3.3. Recycled non-woven fabrics 3.3.4. Recycled fibre application in technical textiles 	 how to form models on extending the lifecycle of products and keeping materials within the economy as much as possible how to conduct creative processes for textile confections made of recyclable materials how to reuse raw materials that are currently disposed of as waste. 					<pre>materials within the economy as much as possible how to conduct creative processes for footwear and accessories made of recyclable materials how to reuse raw materials that are currently disposed of as waste.</pre>		 3.2.2 Reuse of already worn footwear and accessories materials 3.3 Recycled textiles (OPTIONAL) 3.3.1 Recycled fibre 3.3.2. Recycled fibre yarn, woven and knitted fabrics 3.3.3. Recycled non-woven fabrics 3.3.4. Recycled fibre application in technical textiles 		
4. Design for a circular economy	 4.1 Products life cycle, eco-design fundamentals and principles of circular fashion 4.1.1. Eco-design fundamentals 4.1.2. Products life cycle 4.1.3. Principles of circular fashion 4.2 Eco-design principles in fashion and textile industry 4.2.1. Durable and long lasting design 4.2.2. Design for rebirth and circularity 4.2.3. Zero waste design 4.2.4. Design to reduce the need for rapid consumption 	 By the end of this course, the learners will be able to understand: the product life cycle, eco-design fundamentals and principles of circular fashion to promote an "environment friendly" view toward the entire lifecycle of the product to create durable and long-lasting products (the creation of products that can be repaired, modernized, reassembled, with a high value) to improve the design of circular products so that it is easier to repair materials to understand the principles of zero waste design and to create the products using principles of the co-design and circularity 	Learning hours: 14 Self-study hours: 14 ECVET: 6	YES Include in 4.2 basics on Footwear and leather goods eco-design	NO In D4C project it was made during workshop (workshop with stakeholders)	YES Eco-design principles in fashion and footwear and leather goods industry	 By the end of this course, the learners will be able to understand: the product life cycle, eco-design fundamentals and principles of circular fashion to promote an "environment friendly" view toward the entire lifecycle of the product to create durable and long-lasting products (the creation of products that can be repaired, modernized, reassembled, with a high value) to improve the design of circular products so that it is easier to repair materials to understand the principles of zero waste design and to create the products using principles of the co-design and circularity 	4. Design for a circular economy	 4.3 Products life cycle, eco- design fundamentals and principles of circular fashion 4.1.1. Eco-design fundamentals 4.1.2. Products life cycle 4.1.3. Principles of circular fashion 4.4 Eco-design principles in fashion and footwear and leather goods industry 4.2.1. Durable and long- lasting design 4.2.2. Design for rebirth and circularity 4.2.4. Design to reduce the need for rapid consumption 	Learning hours: 14 Self-study hours: 14 ECVET: 6	NO need. It's validated in IO2-A4
5. Manufacture for a circular economy	 5.1 Manufacture processes for a circular economy in fabric production 5.2 Manufacture processes for a circular economy in garment production 5.3 Environmentally friendly production 5.4 Clean technologies production 5.5 Services to support long life 	<pre>The learners will be able to: understand the manufacture processes for a circular economy create ethical and environmentally friendly products by using clean technologies, low impact materials and provide services to support long life source and produce avoiding making waste know services to support a long life.</pre>	Learning hours: 6 Self-study hours: 6 ECVET: 2	YES Approach to footwear and leather goods industry	NO In D4C project it was made during workshop (workshop with stakeholders)	YES Approaches to Footwear and LG	<pre>The learners will be able to: understand the manufacture processes for a circular economy in Footwear and Leather Goods Industry create ethical and environmentally friendly products by using clean technologies, low impact materials and provide services to support long life source and produce avoiding making waste know services to support a long life.</pre>	5. Manufacture for a circular economy	 5.1 Basics on manufacture processes for a circular economy in leather production 5.2 Manufacture processes for a circular economy in footwear and LG production 5.3 Environmentally friendly production 5.4 Clean technologies production 5.5 Services to support long life 	Learning hours: 6 Self-study hours: 6 ECVET: 2	NO need. It's validated in IO2-A4
6. Recycling technologies for a circular economy of textiles	 6.1 The basics of textile recycling 6.2 Textile waste collection, sorting, and preparation for recycling 6.2.1. Waste types in textile production (fibres, yarns, pieces of fabrics, used or unused garments) 6.2.2. Waste sorting principles according to their type, fibre 	By the end of this course, the learners will be able to understand: the existing situation and challenges in textile recycling to know textile recycling's technology. 	Learning hours: 10 Self-study hours: 10 ECVET: 4	YES Approach to Footwear and Leather Goods (accessories) industry Textile approach is also important as it is one of footwear raw material	NO In D4C project it was made during workshop (workshop with stakeholders)	YES Approaches to Footwear and LG (and leather as tanning)	 By the end of this course, the learners will be able to understand: the existing situation and challenges in footwear and leather recycling to know textile, footwear and leather recycling's technology. 	6. Recycling technologies for a circular economy of textile, footwear and leather goods	 6.1 The basics of textile, footwear and leather recycling 6.2 Footwear and LG waste collection, sorting, and preparation for recycling 6.2.1. Waste types in Footwear and Leather production (leather, textiles, pieces of cut materials, used or unused shoes and LG pieces) 6.2.2. Waste sorting principles according to their 	Learning hours: 10 Self-study hours: 10 ECVET: 4	NO need. It's validated in IO2-A4





	<pre>content, colour and other characteristics) 6.2.3. Separation of non- textile parts of recyclable garments 6.3 Technology for textile recycling 6.3.1. Textile waste material recycling into fibre 6.3.2. Yarn production from recycled fibres 6.3.3. Non-woven fabric production from recycled fibres</pre>								<pre>type, content, colour and other characteristics) 6.2.3. Separation of parts of recyclable shoes and LG pieces 6.3 Technology for textile, leather and other materials recycling 6.3.1. Textile waste material recycling into fibre 6.3.2. Leather waste material recycling 6.3.3. Materials production from recycled ones</pre>		
7. Business management in a circular economy	 7.1 Entrepreneurship and new business models for circular economy 7.2 Marketing and user centred approaches 7.3 Systems thinking and networking 7.4 Corporate social responsibility (CSR, also called corporate sustainability) 7.5 Sustainability performance indicators and guidelines 	 By the end of this course, the learners will be able to: understand what a business model is and know how sustainable and circular business model can be defined and implemented to understand the fundamentals of launching a circular economy business venture to acquire knowledge of system thinking and its use in circular economy transition understand networks and collaboration can create additional value 	Learning hours: 14 Self-study hours: 14 ECVET: 6	NO	NO	NO	 By the end of this course, the learners will be able to: understand what a business model is and know how sustainable and circular business model can be defined and implemented to understand the fundamentals of launching a circular economy business venture to acquire knowledge of system thinking and its use in circular economy transition understand networks and collaboration can create additional value 	7. Business management in a circular economy	 7.1 Entrepreneurship and new business models for circular economy 7.2 Marketing and user centred approaches 7.3 Systems thinking and networking 7.4 Corporate social responsibility (CSR, also called corporate sustainability) 7.5 Sustainability performance indicators and guidelines 	Learning hours: 14 Self-study hours: 14 ECVET: 6	NO need. It's validated in IO2-A4
			Learning hours: 70 Self-study hours: 70 ECVET: 28							Learning hours: 70 + 2 Self-study hours: 70 + 4 to 8 ECVET: 28	







4.4. IMPLEMENTATION OF THE 6 STEPS METHODOLOGY FOR CREATING A CURRICULUM ON ECO-DESIGN AND CIRCULARITY IN FURNITURE AND UPHOLSTERY

D4C Modules	D4C Units	D4C Learning Outcomes	Number of hours / ECVET	Need changes LO/modules/ units?	Need prior validation of training needs?	Need research? Additional resource?	Furniture & Upholstery	Modules for Furniture & Upholstery	Units Furniture & Upholstery	Number of hours / ECVET	Final Validation
1. Introduction to circular economy	 1.4 Introduction to circular economy 1.5 Concepts and principles of a circular economy 1.6 Policies supporting Circular Economy 	<pre>By the end of this course, the learners will be able to understand: the purpose of Circular Economy (CE) how to apply the principles of CE management the limits of the current linear economy the benefits of CE the concept of CE (its historic development, its definitions, its principles) the current barriers associated with CE the requisites for the implementation of CE the position of CE within the sustainable development concept.</pre>	Learning hours: 6 Self- study hours: 6 ECVET: 2	NO	NO - already articulated in validation workshops	NO	<pre>By the end of this course, the learners will be able to understand: the purpose of Circular Economy (CE) how to apply the principles of CE management the limits of the current linear economy the benefits of CE the concept of CE (its historic development, its definitions, its principles) the current barriers associated with CE the requisites for the implementation of CE the position of CE within the sustainable development concept.</pre>	1. Introduction to circular economy	 1.4 Introduction to circular economy 1.5 Concepts and principles of a circular economy 1.6 Policies supporting Circular Economy 	Learning hours: 6 Self-study hours: 6 ECVET: 2	NO need. It's validated in IO2-A4
2. Sustainability challenges in the textile and Fashion industry	 2.5 Alarming trends in textile and leather industry in terms of waste and environmental issues and social impact 2.6 People health and safety 2.7 Waste, package and environmental footprint according to the national and EU regulations 2.8 Ethical production 	 By the end of this course, the learners will be able to understand: the existing situation and challenges in textile industry EU and worldwide the natural and technical cycles of matter and energy the impact of CE to people health and safety how to supervise the environmental practices of the company in order to comply with the national and EU regulations how to apply critical success actions and best practices in CSR on key topics 	Learning hours: 10 Self- study hours: 10 ECVET: 4	YES Widen the scope of unit 2.1 to include furniture and upholstery	NO Validation of good practices in furniture and upholstery In D4C project it was made during workshop (workshop with stakeholders)	YES Alarming practices in Footwear and Leather industry on environmental and social impact	<pre>By the end of this course, the learners will understand • the existing situation and challenges in Furniture and Upholstery industry EU and worldwide • the natural and technical cycles of matter and energy • the impact of CE to people health and safety • how to supervise the environmental practices of the Furniture and Upholstery companies in order to comply with the national and EU regulations • how to apply critical success actions and best</pre>	2. Sustainability challenges in the Furniture and Upholster industry	 2.5 Alarming trends in Furniture and Upholstery and leather industry in terms of waste and environmental issues and social impact 2.6 People health and safety 2.7 Waste, package and environmental footprint according to the national and EU regulations 2.8 Ethical production 	Learning hours: 10 Self-study hours: 10 ECVET: 4	NO need. It's validated in IO2-A4







		how to optimize the					practices in CSR on				
		use of resources by					key topics				
		circulating					how to optimize the				
		products and					use of resources by				
		materials					circulating				
							products and				
							materials				
3. Materials	3.2 Sustainable textile and non-	By the end of this	Learning	YES	NO	YES	By the end of this	3. Materials	3.4 Sustainable textile and non-	Learning	NO need.
for a circular	textile materials	course, the learners	hours: 10				course, the learners	for a circular	textile materials	hours: 10	It's
economy	3.1.1 Sustainable natural	will be able to:	Self-	To include	Validation of	Sustainable	will be able to:	economy	3.1.1 Sustainable natural	Self-study	validated
	(cotton, bast, wool, silk)		study	approach to	needs on	leather, Eco			(cotton, bast, wool, silk) fibre	hours: 10	in 102-A4
	fibre production	take decisions on	hours: 10	sustainable	sustainable	leather and	take decisions on		production	ECVET: 4	
	3.1.2 Sustainable production of	the applicability	ECVET: 4	leatner,	leather, Eco	otners	the applicability		3.1.2 Sustainable production of		
	2 1 2 Gustainshla sunthatia	of certain		ECO leather	leather and	Furniture and	of certain		regenerated cellulosic libres		
	fibre preduction	materials based on		Euroituro	Euroiture and	ophoistery	materials based on		s.i.s Sustainable Synthetic libre		
	3 1 4 Sustainable shemical	cheir ecological		rurnicure	Inholotory	matariala	their ecological		3 1 4 Sustainable chemical		
	technologies for textile	potential		Unholetory	wates as raw	Materials	potential		technologies for textile		
	3 1 5 Low impact materials pop	• Select Suppliers of		wates as	material for	Furniture and	• Select suppliers of		3 1 5 Low impact materials non		
	textile materials (for example	Induceriais and		raw	uncyclin	Inholetory	Indleridis dilu		textile materials (for example		
	leather Seacell Chitosan or			material	upcycrii	wastes			leather Seacell Chitosan or		
	Chitin, Corkshell, Milk	charactoristics		for		Wabeeb	charactoristics		Chitin, Corkshell, Milk protein.		
	protein, etc.)			upcycling	Th D4C		domonstrate the		etc.)		
	,,,,,,,	apirit of groativo		-11	project it		- demonstrate the		3.1.6 Sustainable leather. Eco		
	3.4 Textile waste as raw	reuse of recyclable		Change	was made		reuse of recyclable		leather and others Furniture and		
	material for upcycling	materials		approach on	during		materials		Upholstery related materials		
	3.2.1 Garment production waste	<pre>hatterials</pre>		Unit 3.2	workshop		<pre>hatterials</pre>				
	materials	recoverable		for	(workshop		recoverable		3.5 Furniture and Upholstery		
	3.2.2 Reuse of already worn	materials		Furniture	with		materials		waste as raw material for		
	garment materials	<pre>design, plan and</pre>		and	stakeholders)		<pre>design, plan and</pre>		upcycling		
		develop materials		Upholster			develop materials		3.2.1 Furniture and Upholstery		
	3.5 Recycled textiles	that can be later					that can be later		production waste materials		
	3.3.1 Recycled fibre	reused		Unit 3.3			reused		3.2.2 Reuse of already worn		
	3.3.2. Recycled fibre yarn,	how to manufacture		will be			how to manufacture		Furniture and Upholstery		
	woven and knitted fabrics	products from		optional			products from		materials		
	3.3.3. Recycled non-woven	recoverable					recoverable				
	Iabrics	materials					materials		3.6 Recycled textiles (OPTIONAL)		
	3.3.4. Recycled Ilbre	how to formulate					how to formulate		3.3.1 Recycled fibre warn wewen		
	towtilog	recycling and					recycling and		and knitted fabrics		
	LEALITES	manufacturing					manufacturing		3 3 3 Recycled non-woven fabrics		
		habits of reusable					habits of reusable		3 3 4 Recycled fibre application		
		material products					material products		in technical textiles		
		how to form models					how to form models				
		on extending the					on extending the				
		IIIecycle ol					illecycle ol				
		kooping materials					kooping materials				
		within the economy					within the economy				
		as much as possible					as much as possible				
		• how to conduct					• how to conduct				
		creative processes					creative processes				
		for textile					for furniture and				
		confections made of					upholstery made of				
		recyclable					recyclable				
		materials					materials				
		how to reuse raw					how to reuse raw				
		materials that are					materials that are				
		currently disposed					currently disposed				
		of as waste.					of as waste.				
4. Design for	4.5 Products life cycle, eco-	By the end of this	Learning	YES	NO	YES	By the end of this	4. Design for	4./ Products life cycle, eco-	Learning	NO need.
a circular	design fundamentals and	course, the learners	nours: 14	T	T. D/0	Ber 1	course, the learners	a circular	design fundamentals and	hours: 14	ít's
economy	principles of circular	will be able to	Selt-	Include in	In D4C	Eco-design	will be able to	economy	principles of circular	Self-study	validated
	Iashion	understand:	study	4.2 basics	project it	principles in	understand:		Iashion	nours: 14	in 102-A4
	4.1.1. Eco-design Iundamentals	• the product life	FOVER. 6	Furniture	was made	Furniture and	• the product life		4.1.1. Eco-design Iundamentals	ECVET: 0	
	4 1 3 Principles of circular	- the product life	ECAET. 0	and	workshop	Inholstery	- the product file		4 1 3 Principles of circular		
	fashion	fundamentals and		Upholsterv	(workshop	industry	fundamentals and		fashion		
		principles of		eco-design	with		principles of				
		circular fashion			stakeholders)		circular fashion				





	 4.6 Eco-design principles in fashion and textile industry 4.2.1. Durable and long lasting design 4.2.2. Design for rebirth and circularity 4.2.3. Zero waste design 4.2.4. Design to reduce the need for rapid consumption 	 to promote an "environment friendly" view toward the entire lifecycle of the product to create durable and long-lasting products (the creation of products that can be repaired, modernized, reassembled, with a high value) to improve the design of circular products so that it is easier to repair materials to understand the principles of zero waste design and to create the products using principles of the eco-design and circularity 					 to promote an "environment friendly" view toward the entire lifecycle of the product to create durable and long-lasting products (the creation of products that can be repaired, modernized, reassembled, with a high value) to improve the design of circular products so that it is easier to repair materials to understand the principles of zero waste design and to create the products using principles of the eco-design and circularity 		 4.8 Eco-design principles in fashion and Furniture and Upholstery industry 4.2.1. Durable and long-lasting design 4.2.2. Design for rebirth and circularity 4.2.3. Zero waste design 4.2.4. Design to reduce the need for rapid consumption 		
5. Manufacture for a circular economy	 5.6 Manufacture processes for a circular economy in fabric production 5.7 Manufacture processes for a circular economy in garment production 5.8 Environmentally friendly production 5.9 Clean technologies production 5.10 Services to support long life 	<pre>The learners will be able to: understand the manufacture processes for a circular economy create ethical and environmentally friendly products by using clean technologies, low impact materials and provide services to support long life source and produce avoiding making waste know services to support a long life.</pre>	Learning hours: 6 Self- study hours: 6 ECVET: 2	YES Approach to Furniture and Upholstery industry	NO In D4C project it was made during workshop (workshop with stakeholders)	YES Approaches to Furniture and Upholstery	The learners will be able to: understand the manufacture processes for a circular economy in Footwear and Leather Goods Industry create ethical and environmentally friendly products by using clean technologies, low impact materials and provide services to support long life source and produce avoiding making waste know services to support a long life.	5. Manufacture for a circular economy	 5.6 Basics on manufacture processes for a circular economy in leather production 5.7 Manufacture processes for a circular economy in Furniture and Upholstery production 5.8 Environmentally friendly production 5.9 Clean technologies production 5.10 Services to support long life 	Learning hours: 6 Self-study hours: 6 ECVET: 2	NO need. It's validated in IO2-A4
6. Recycling technologies for a circular economy of textiles	 6.4 The basics of textile recycling 6.5 Textile waste collection, sorting, and preparation for recycling 6.2.1. Waste types in textile production (fibres, yarns, pieces of fabrics, used or unused garments) 6.2.2. Waste sorting principles according to their type, fibre content, colour and other characteristics) 6.2.3. Separation of non-textile parts of recyclable garments 	<pre>By the end of this course, the learners will be able to understand: • the existing situation and challenges in textile recycling • to know textile recycling's technology.</pre>	Learning hours: 10 Self- study hours: 10 ECVET: 4	YES Approach to Footwear and Furniture and Upholstery industry Textile approach is also important as it is one of Furniture and	NO In D4C project it was made during workshop (workshop with stakeholders)	YES Approaches to Furniture and Upholstery (and leather as tanning)	<pre>By the end of this course, the learners will be able to understand: • the existing situation and challenges in footwear and leather recycling • to know textile, Furniture and Upholstery recycling's technology.</pre>	6. Recycling technologies for a circular economy of textile, footwear and leather goods	 6.4 The basics of textile, Furniture and Upholstery recycling 6.5 Furniture and Upholstery waste collection, sorting, and preparation for recycling 6.2.1. Waste types in Furniture and Upholstery and Leather production (leather, textiles, pieces of cut materials, used or unused Furniture and Upholstery pieces) 6.2.2. Waste sorting principles according to their type, content, colour and other characteristics) 6.2.3. Separation of parts of recyclable shoes and LG pieces 	Learning hours: 10 Self-study hours: 10 ECVET: 4	NO need. It's validated in IO2-A4







				-	-		-	-		
	6.6 Technology for textile			Upholstery					((Technology for toutil)	
	recycling			raw					6.6 Technology for textile,	
	6.3.1. Textile waste material			material					leather and other materials	
	recycling into fibre								recycling	
	6.3.2. Yarn production from								6.3.1. Textile waste material	
	recycled fibres								recycling into fibre	
	6.3.3. Non-woven fabric								6.3.2. Leather waste material	
	production from recycled fibres								recycling	
	1 1								6.3.3. Materials production from	
									recycled ones	
7. Business	7.6 Entrepreneurship and new	By the end of this	Learning	NO	NO	NO	By the end of this	7. Business	7.6 Entrepreneurship and new	Learning NO need.
management in	business models for circular	course, the learners	hours: 14				course, the learners	management in	business models for circular	hours: 14 It's
a circular	economy	will be able to:	Self-				will be able to:	a circular	economy	Self-study validated
economy	7 7 Marketing and user centred	will be able to.	study				will be able to:	economy	7 7 Marketing and user centred	hours: 14 in TO2-A4
ceonomy	approaches	• understand what a	bourse 1/				• understand what a	cconomy	approaches	FOVET 6
	approacties	• understand what a	nours. 14				- understand what a		7 0 Gustana thinking and	ECVEL. 0
	7.0 Systems thinking and	business model is	ECVEI: 0				business model is		7.0 Systems thinking and	
	networking 7 0 Geographical	and know now					and know now		networking	
	7.9 Corporate social	sustainable and					sustainable and		7.9 Corporate social	
	responsibility (CSR, also	circular business					circular business		responsibility (CSR, also	
	called corporate	model can be					model can be		called corporate	
	sustainability)	defined and					defined and		sustainability)	
	7.10 Sustainability	implemented					implemented		7.10 Sustainability	
	performance indicators and	to understand the					to understand the		performance indicators and	
	guidelines	fundamentals of					fundamentals of		guidelines	
		launching a					launching a			
		circular economy					circular economy			
		business venture					business venture			
		to acquire					to acquire			
		knowledge of system					knowledge of system			
		thinking and its					thinking and its			
		use in circular					use in circular			
		economy transition					economy transition			
		 understand networks 					understand networks			
		and collaboration					and collaboration			
		can create					can create			
		additional value					additional value			
			Learning							Learning
			hours: 70							hours: 70
			Self-							Self-study
			studv							hours: 70
			hours: 70							ECVET: 28
			ECVET: 28							



5. CONCLUSIONS

As we understand from the exercise on adaptation of the Design4Circle curriculum into the different sectors - Footwear and Leather Goods and Furniture and Upholstery - the original curriculum is transferable in more than 80%.

For both cases:

Module 1 - Introduction to Circular Economy - total match
Module 2 - Sustainability challenges in textile and fashion industry high level match
Module 3 - Materials for a circular economy - high level match
Module 4 - Design for a Circular Economy - high level match
Module 5 - Manufacture for a circular economy - need adaptations to match
Module 6 - Recycling technologies for a circular economy in a textile and
fashion industry - need adaptations to match
Module 7 - Business management in a Circular Economy - total match

Both exercises prove the effectiveness of the 6 steps methodology to design curricula on eco-design and circularity based on the Design4Circle joint curriculum on ECO-DESIGN FOR CIRCULAR ECONOMY IN THE TEXTILE AND FASHION INDUSTRIES, proves its transferable character and foresee its suitability to many other sectors of activity that have eco-design and circularity as challenges for social and environmental responsibility and overall competitiveness.