Catalogue of MILLE Courses

EIT Raw Materials MILLE

MIcrocredentials for **L**ifelong **L**earning in **E**ngineering

EIT RawMaterials MILLE

MIcrocredentials for Lifelong Learning in Engineering

Project number: 22016

Supported by

Co-funded by the European Union

This project has been funded with support from the €pean Commission.
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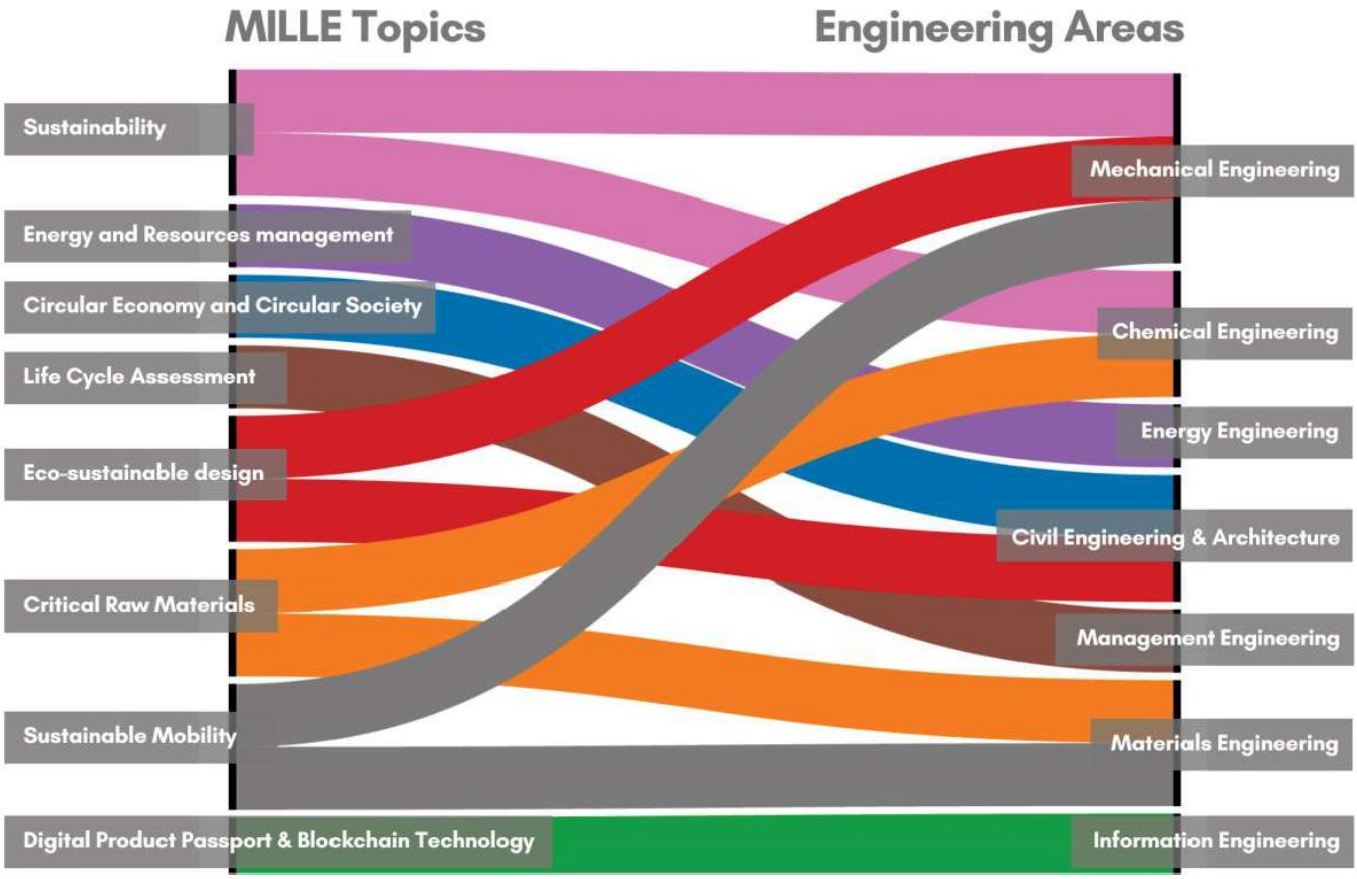
project description

A continuously growing attention is being paid to innovative ways of Lifelong Learning based on a Human-Centric approach and facing several challenges: learning tailored on the diverse individual needs of each learner, and flexible enough to enable each learner to progress at their own pace; a system in which everyone has access in learning and is therefore inclusive and where everyone continuously improves on existing skills and acquires new ones based on their individual needs. Lifelong Learning, based on innovative training and teaching tools, is becoming a strategic instrument for implementing innovation into SMEs. Empowering workers to up- and re-skill throughout their entire lives is the key-challenge for next years, increasing permeability between different education pathways/systems and improving flexibility, both from person and Company viewpoints, thus fostering more innovative and inclusive approaches and facilitating access to labor market and job transitions. Individuals can accumulate learning outcomes over time and across institutions and sectors, facilitated by e-learning schemes.



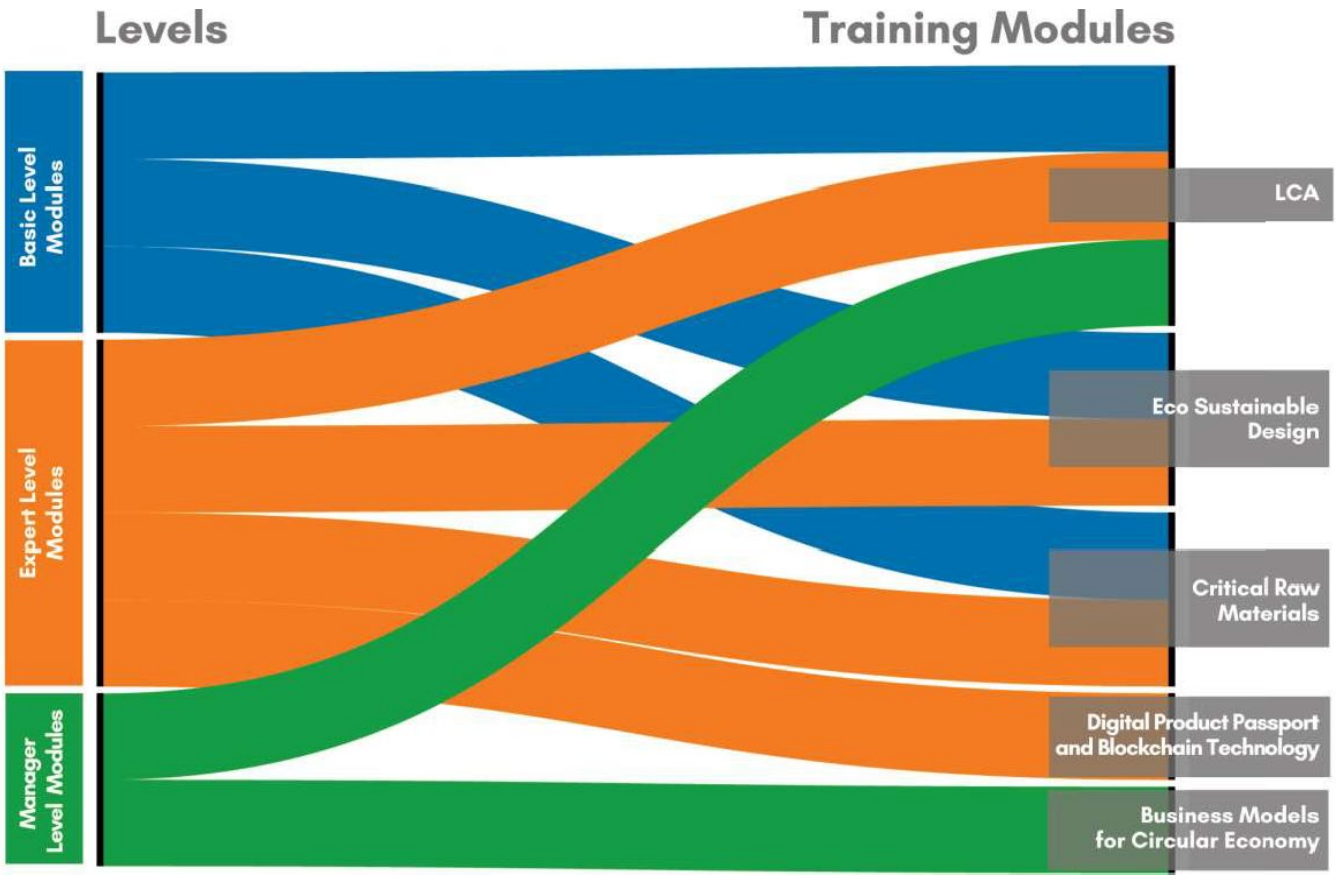
MILLE Project will highly contribute to this scenario, in the Area of Raw Materials, Sustainability, Design for Circularity, Traceability methodologies, by means of the multi-disciplinary micro-credential programs, associated to Digital certifications (e.g. €pean Digital Skills Certificate, Open Digital Badges, see Digital Education Action Plan 2021-2027) and addressed to professionals and workers in several engineering areas, as shown in the above figure.

This Catalogue displays the organization of MILLE Training modules, jointly developed by Padova University and Fraunhofer Institute, in cooperation with SIAV – Confindustria Veneto and FVEM (Federación Vizcaína de Empresas del Metal), under the financial support of EIT – Raw Materials.

The MILLE training modules are based on:

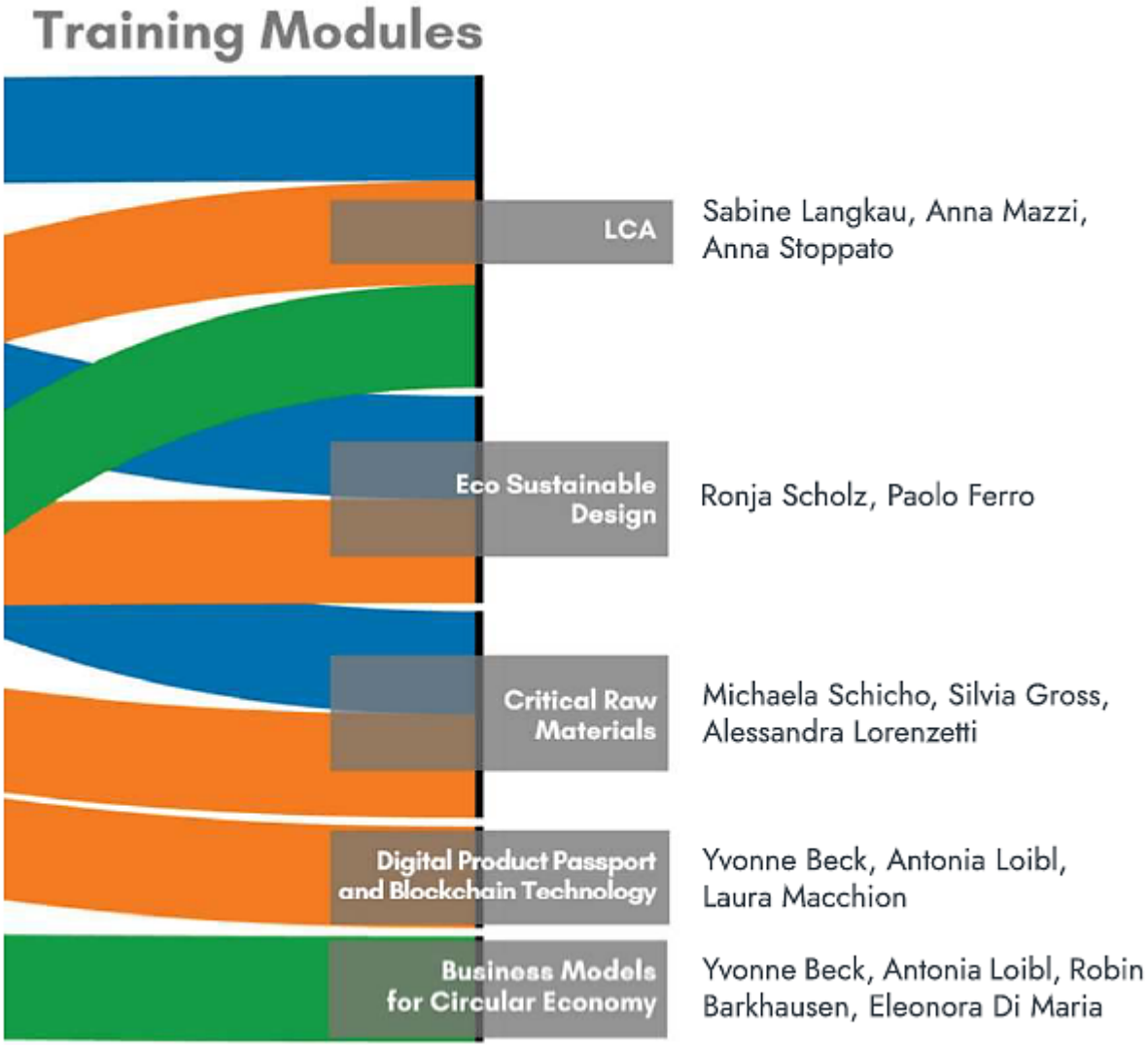
- three levels of development of contents (Basic, Expert, Manager),
- five key-topics (Life Cylce Assessment, Eco-sustainable design, Critical Raw Materials, Digital Product Passport, Business Models for Circular Economy),

as summarised in the figure below.



In the next pages, all the training modules are described in terms of Preliminary requirements, Knowledge & abilities to be achieved, Contents Teaching Methodologies and References.

lecturers


Training Modules
LCA
Sabine Langkau, Anna Mazzi, Anna Stoppato
Eco Sustainable Design
Ronja Scholz, Paolo Ferro
Critical Raw Materials
Michaela Schicho, Silvia Gross, Alessandra Lorenzetti
Digital Product Passport and Blockchain Technology
Yvonne Beck, Antonia Loibl, Laura Macchion
Business Models for Circular Economy
Yvonne Beck, Antonia Loibl, Robin Barkhausen, Eleonora Di Maria

Course features		
Delivery mode	Online training - the timing is set by the student	
Language	English	
Achievements	• Certificate of attendance • Micro-credentials (if final test passed successfully)	
Course Availability	The activity will be available **from 21 October** Please be advised that the activity is to be completed by 15 December 2024	
Costs and deadline	**Pre-enrolment mandatory** by **10 October at 12.30 p.m.** ❑ **€ 30**	
Course fee (*including micro-credential certification*)	➢ Life Cycle assessment (LCA) BM1 – 172,50 € ➢ Eco-sustainable Design BM2 – 172,50 € ➢ Resource Management & Critical Raw Materials BM3 – 172,50 € ➢ Life Cycle assessment (LCA) EM1 – 322,50 € ➢ Eco-sustainable design EM3 – 322,50 € ➢ Resource Management & Critical Raw Materials EM2 – 322,50 € ➢ Digital Product Passport and Blockchain Technology EM4 – 222,50 € ➢ LCA & Life Cycle Thinking MM1 – 322,50 € ➢ Circular Economy (Business Models, Regulatory Framework, Certification) MM2 – 322,50 €	
Steps to enrol	**Pre-enrolment** www.uniweb.unipd.it	**Enrolment** www.uniweb.unipd.it
USEFUL LINKS	Pre-enrolment Tutorial Enrolment Tutorial Website https://mille.ingegneria.unipd.it/ Public Call https://www.unipd.it/corsi-aggiornamento-professionale Catalogue https://mille.ingegneria.unipd.it/wp-content/uploads/2024/09/MILLE_courses_forms.pdf	

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Basic Level Modules

BM1

Life Cycle Assessment (LCA)

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Life Cycle Assessment (LCA) – Basic Module (BM1)	
The course in brief	The module is organized into 5 sections: 1. Introduction to life cycle approach; 2. LCA principles and framework; 3. LCA to support Environmental Labels; 4. Relevance of inventory in LCA studies; 5. LCA for circular economy and for energy transition. Upon completion of the course, the students will acquire knowledge on: • principles to evaluate environmental impacts from a life cycle and circular economy perspective • general requirements to conduct consistent LCA studies • summary of the Contents of ISO 14040 and ISO 14044 • areas of application of LCA results in the industrial field • main environmental labels that use the life cycle approach
Communication Skills	The course emphasizes the importance of acquiring LCA terminology and updating existing assessment techniques. This will enhance the participants' ability to communicate effectively with colleagues and clients regarding LCA analyses and environmental issues.
Learning Skills	By engaging with the course content, participants will develop skills to stay current with advancements in LCA studies and analyses. This continuous learning approach is crucial for maintaining professional competency in LCA and environmental analyses.
Delivery mode	Online training - the timing is set by the student
Credits	4
Hours	24

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Basic Level Modules

BM2

Eco-sustainable design

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Eco-sustainable Design – Basic Module (BM2)	
The course in brief	The module introduces to a system understanding of Eco-sustainable design, the concept of a Circular Economy and Design requirements from a systemic perspective as well as a material related design. The following topics will be covered: • Ecodesign and Circular Economy • Ecodesign in the design process, what skills and focus when? • Ecodesign in EU-Regulation; • Circular business models • Product/Service/System-Design - a new leverage for sustainability • A basic introduction to reliability in electronic systems • Energy related design aspects; • Deep dive Electronics - Understanding impacts and design • Materials in design and related issues (CRM) • The design process: concept, embodiment, details • A materials selection systematic approach • Co-selection material and shape to serve for material use improved efficiency • How to face multi-objectives design problem in material selection • Eco-design driven material choice
Communication Skills	The course emphasizes the importance of acquiring CE and CRM information and concepts, and to use them in the design chain. This will enhance the participants' ability to communicate effectively with colleagues and clients regarding design and manufacturing of eco-sustainable components.
Learning Skills	By engaging with the course content, participants will develop skills to stay current with advancements design procedures, taking into account CE and CRM issues. This continuous learning approach is crucial for maintaining professional competency in the area of sustainable design and manufacturing of industrial components.
Delivery mode	Online training - the timing is set by the student
Credits	4
Hours	24

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Basic Level Modules

BM3

Resource Management & Critical Raw Materials

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Resource Management & Critical Raw Materials – Basic Module (BM3)	
The course in brief	The BM3 module aims at introducing to a general audience the topics of critical raw materials by contextualizing it into the broader framework of natural resources and their scarcity. The module will present the resource topic, along with its regulatory framework, and will then introduce the topic of critical and strategic raw materials along the whole value chain (mining, processing and use, recovery, recycling, End of Life/End of Waste, overall and supply chain). A particular focus will be on mitigation strategy to address criticality (i.e. substitution, recovery, urban mining). A focus on a selection of CRM will be made.
Communication Skills	The course emphasizes the importance of acquiring CRM terminology and updating existing normative issues. This will enhance the participants' ability to communicate effectively with colleagues and clients regarding CRM and related recovery and recycling processes.
Learning Skills	By engaging with the course content, participants will develop skills to stay current with advancements about CRM reports and standards. This continuous learning approach is crucial for maintaining professional competency in the area of CRM and related recovery and recycling processes.
Delivery mode	Online training - the timing is set by the student
Credits	4
Hours	24

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Expert Level Modules

EM1

Life Cycle Assessment (LCA)

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Life Cycle Assessment (LCA) – Expert Module (EM1)	
The course in brief	The module is organized into 5 sections: 1. introduction to the life cycle approach; 2. steps of LCA and contents; 3. LCA in practice with softwares and databases; 4. LCA to support environmental labels; 5. LCA in circular economy and energy transition. Upon completion of the course, the students will acquire knowledge on: • the relevance of life cycle approach and LCA in CE and ecodesign; • general and specific requirements to conduct consistent LCA studies; • detailed information on the content of ISO 14040 and ISO 14044; • detailed information on the main areas of application of LCA to support environmental strategies, ecodesign, and green marketing; • main benefits and difficulties in applying the LCA methodology.
Communication Skills	The course emphasizes the importance of managing LCA methodologies and updating existing assessment techniques. This will enhance the participants' ability to communicate effectively with colleagues, clients and management regarding application of LCA analyses to solve environmental issues.
Learning Skills	By engaging with the course content, participants will develop skills to manage results and advancements in LCA studies and analyses. This continuous learning approach is crucial for maintaining and increasing professional competency in LCA and environmental analyses.
Delivery mode	Online training - the timing is set by the student
Credits	4
Hours	24

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Expert Level Modules

EM2

Eco-sustainable Design

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Eco-sustainable design – Expert Module (EM2)	
The course in brief	The Course introduces to a system understanding of Eco-sustainable design, the concept of a Circular Economy and Design requirements from a systemic perspective as well as a material related design. The main topics of the Course are: ○ Ecodesign and the Circular Economy ○ Ecodesign in the design process, what skills and focus when? ○ Ecodesign in EU-Regulation; Circular business models ○ NetZero, R-Strategy-Waste management ○ Product/Service/System-Design ○ A basic introduction to reliability in electronic systems ○ Circular & Ecodesign tools ○ Ecodesign - Measurement, Indicators, Labels ○ Energy related design aspects ○ Deep dive Electronics – Understanding impacts and design ○ Materials in design and related issues ○ How to face multi-objectives design problem in material selection; ○ Eco-design driven material choice ○ Design for Recycling in a Critical Raw Materials Perspective; ○ Material Substitution in a Critical Raw Materials Perspective ○ Product design from an environmental and critical raw materials perspective ○ Lightweight design versus raw materials criticalities
Communication Skills	The course emphasizes the importance of managing design tools addressed at eco-sustainability. This will enhance the participants' ability to communicate effectively with colleagues, clients and management regarding innovative and eco-sustainable design and manufacturing solutions and strategies.
Learning Skills	By engaging with the course content, participants will develop skills to address Company design chain towards eco-sustainability. This continuous learning approach is crucial for maintaining and increasing professional competency (and Company commitment) to design, manufacturing and production of eco-sustainable and CRM-sensitive components.
Delivery mode	Online training - the timing is set by the student
Credits	4
Hours	24

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Expert Level Modules

EM3

Resource Management & Critical Raw Materials

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Resource Management & Critical Raw Materials – Expert Module (EM3)	
The course in brief	The Course aims at introducing to an expert audience the topics of critical raw materials by contextualizing it into the broader framework of natural resources and their scarcity. The module will present the methodology Material Flow Analysis as a quantitative tool for research management and its applicability to criticality and circularity. Detailed insights in the methodology of the criticality assessment will be provided and mitigation measures to decrease the criticality will be discussed. The module includes case studies from several industrially relevant metals.
Communication Skills	The course emphasizes the importance of managing Material Flow Analysis tools and CRM regulatory issues. This will enhance the participants' ability to communicate effectively with colleagues, clients and management regarding application of Material Flow Analysis tools and CRM protocols.
Learning Skills	By engaging with the course content, participants will develop skills to manage Material Flow Analysis tools and CRM regulatory issues. This continuous learning approach is crucial for maintaining and increasing professional competency (and Company commitment) in Material Flow Analysis and CRM regulations.
Delivery mode	Online training - the timing is set by the student
Credits	4
Hours	24

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Expert Level Modules

EM4

Digital Product Passport and Blockchain Technology

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Digital Product Passport and Blockchain Technology – Expert Module (EM4)	
The course in brief	This module comprises an introduction to Digital Product Passports and Blockchains addressed to management personnel in companies. The course is structured in the following sections: ○ Introduction ○ CSR and risk management ○ Supply chains ○ Digital Product Passport ○ Digital supply chains ○ Blockchain ○ Insights and conclusions
Communication Skills	The course emphasizes the importance of managing sustainable supply chains, traceability, blockchains. This will enhance the participants' ability to communicate effectively with colleagues, clients and management regarding innovative, digital and eco-sustainable approach to manage supply chains.
Learning Skills	By engaging with the course content, participants will develop skills to address Company supply chain towards eco-sustainability by means of digital tools, based on blockchain technologies. This continuous learning approach is crucial for maintaining and increasing professional competency (and Company commitment) to digital management of supply chains.
Delivery mode	Online training - the timing is set by the student
Credits	2
Hours	12

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Manager Level Modules

MM1

LCA & Life Cycle Thinking

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LCA & Life Cycle Thinking - Manager Module (MM1)	
The course in brief	The module is organized into 5 sections: 1) introduction to LCT and LCA 2) LCA principles and framework 3) LCA to support environmental labels 4) Life Cycle approach for sustainability assessment 5) LCA for circular economy and for energy transition Upon completion of the course, the students will acquire knowledge on: • Life Cycle Thinking approach • principles and models to evaluate environmental impacts from the life cycle and circular perspective • international requirements for LCA studies: ISO 14040-14044 standards • areas of application of LCA studies in the industrial field and its main results • goal, scope and contents of Life Cycle Costing, Social LCA and Life Cycle Sustainability Assessment • international and €pean policies to support environmental impact assessment and life cycle approach
Communication Skills	The course emphasizes the importance of understanding from a manager viewpoint the results of LCA methodologies and sustainability assessment. This will enhance the participants' ability to communicate effectively with stakeholders and with communities the solutions suggested by application of LCA analyses to solve environmental issues.
Learning Skills	By engaging with the course content, participants will develop skills to manage outcome and strategies deriving from LCA studies and analyses. This continuous learning approach is crucial for implementing at Company level LCA and environmental analyses in a circular economy framework.
Delivery mode	Online training - the timing is set by the student
Credits	3
Hours	24

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Manager Level Modules

MM2

Circular Economy (Business Models, Regulatory Framework, Certification)

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Circular Economy (Business Models, Regulatory Framework, Certification) - Manager Module (MM2)	
The course in brief	The module is organized into 4 sections: - an introduction to circular economy and sustainability; - business model description of the main characteristics and components; - business models in the circular economy framework focused on presenting and knowing the different circular business models a firm can adopt; - regulatory framework and certification to present the different regulations related to circular economy in terms of design and product management and certification schemes available.
Communication Skills	The course emphasizes the importance of taking advantage, from a business viewpoint, of CE models and regulations. This will enhance the participants' ability to communicate effectively with staff, clients and stakeholders regarding innovative approaches to Circular Economy.
Learning Skills	By engaging with the course content, participants will develop skills to address Company towards sustainable circular economy business models. This continuous learning approach is crucial for maintaining and increasing commitment and competitivity of Companies in an eco-sustainable context.
Delivery mode	Online training - the timing is set by the student
Credits	4
Hours	24

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