Presentazione del Piano Formativo

Webinar
05/12/2023

microcredential learning in for lifelong engineering

Programma

16.30	Introduzione: il progetto MILLE e le sue finalità F. Bonollo, Presidente Scuola di Ingegneria, Università di Padova
16.35	Lifelong learning: uno strumento di miglioramento continuo N. Spiezia, vice-Presidente dell'Associazione Alumni UNIPD S. Miotto, Direttore SIAV – Confindustria Veneto
16.55	Il piano formativo di MILLE F. Bonollo, Presidente Scuola di Ingegneria, Università di Padova
17.05	Esempi di moduli formativi S. Gross, DISC, Università di Padova P. Ferro, DTG, Università di Padova
17.20	MILLE e acquisizione delle micro-credenziali M. Ghisi, Delegata dell'Università di Padova alla formazione permanente
17.30	Calendario delle attività e conclusioni F. Bonollo, Presidente Scuola di Ingegneria, Università di Padova

Introduzione

Introduzione

microcredential for lifelong learning in engineering

Il Progetto MILLE

- Continua evoluzione degli scenari tecnologici e lavorativi
- Continuo impegno in termini di formazione e aggiornamento richiesto a persone e aziende
- Iniziative di formazione permanente (lifelong learning) coordinate, personalizzate, in grado di garantire la qualità dei contenuti e di certificare le competenze fatte acquisire.

- **Progetto MILLE**
- **MIcro-credentials for Lifelong Learning in Engineering**

- finanziato da EIT-RM e coordinato dalla Scuola di Ingegneria dell'Università di Padova, con la collaborazione del Fraunhofer Institute, di SIAV – Confindustria Veneto e di FVEM (Federazione delle Industrie Metallurgiche dei Paesi Baschi).

Lifelong learning: strumento di miglioramento continuo

N. Spiezia
vice-Presidente dell'Associazione Alumni UNIPD

S. Miotto
Direttore SIAV – Confindustria Veneto

Il Piano Formativo di MILLE – *premessa*

➔Flessibilità: modalità online a-sincrona

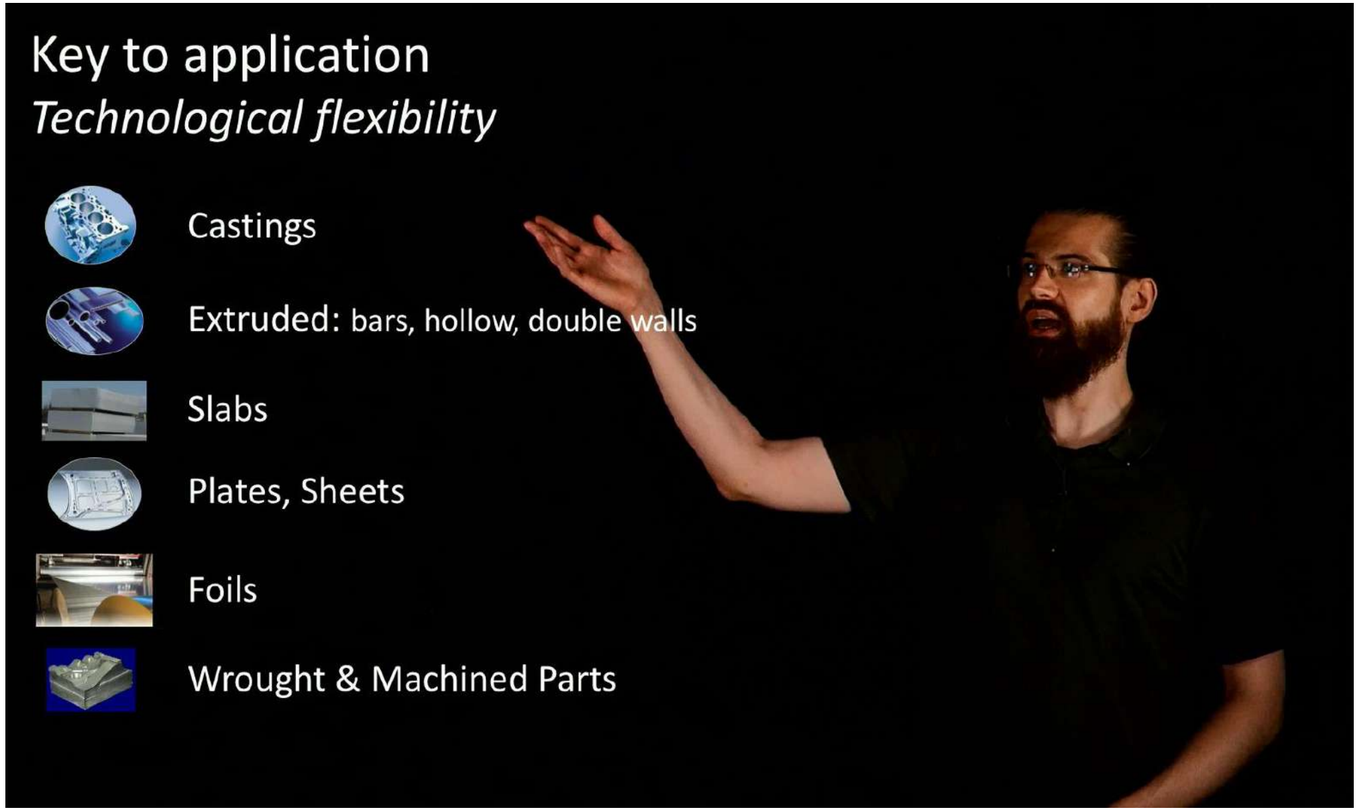
➔4 ore settimanali

➔6 settimane

➔Check periodico con docenti

➔Docenti universitari e industriali

➔Micro-credenziali



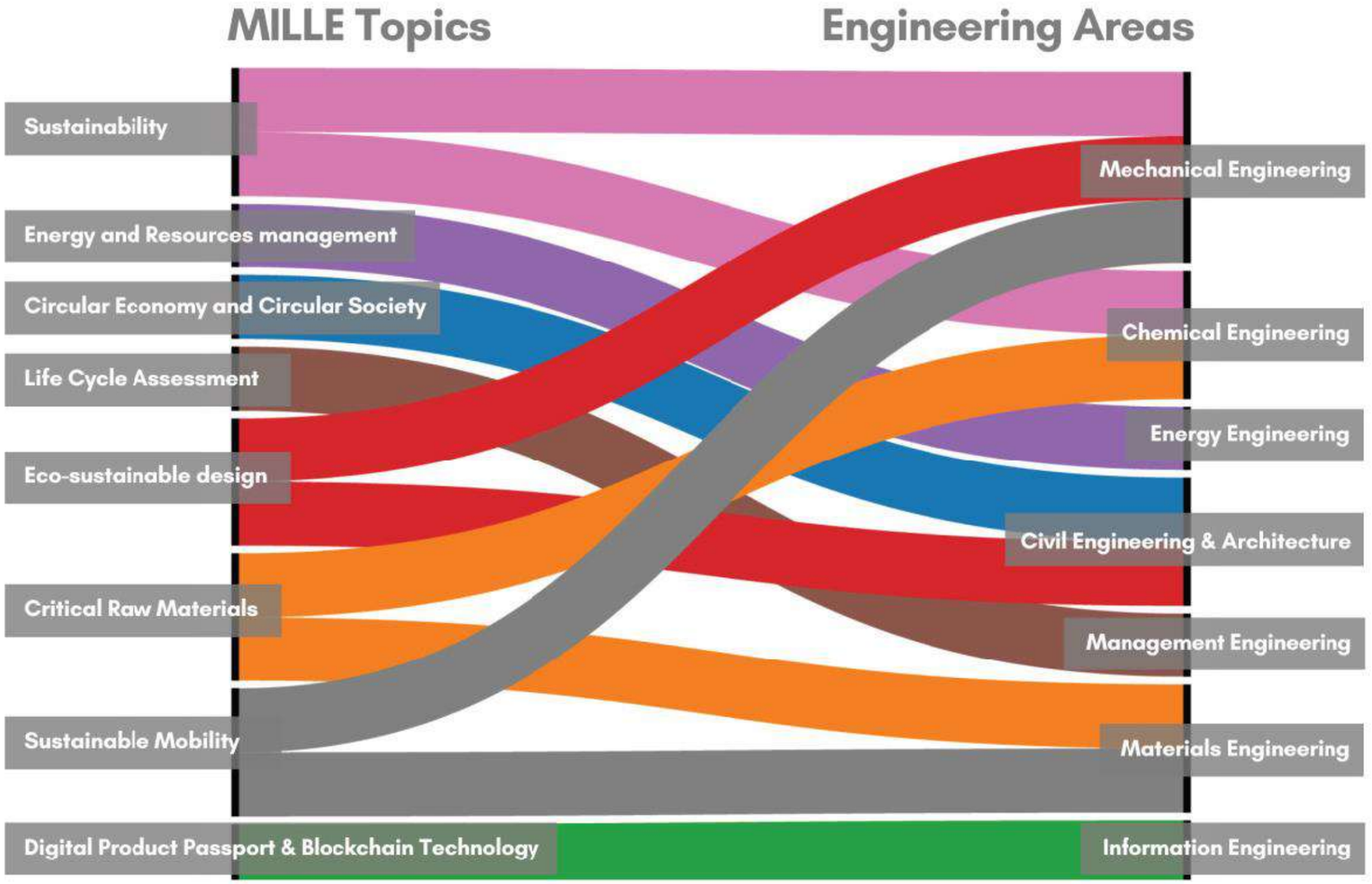
Il Piano Formativo di MILLE

- Serie di moduli formativi online snelli e flessibili, focalizzati su tematiche quali le materie prime, il design sostenibile, la valutazione degli impatti ambientali, l'economia circolare.

- Frequenza personalizzata, con contenuti calibrati rispetto ai singoli profili professionali

- Certificazione digitale, basata sul nuovo standard europeo delle micro-credenziali, delle competenze acquisite.

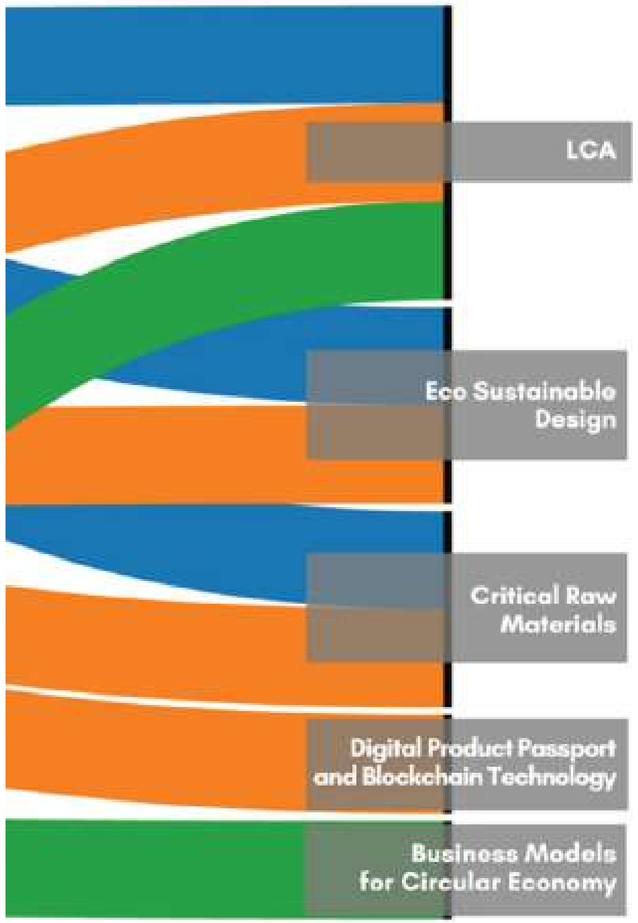
Il Piano Formativo di MILLE



Il Piano Formativo di MILLE

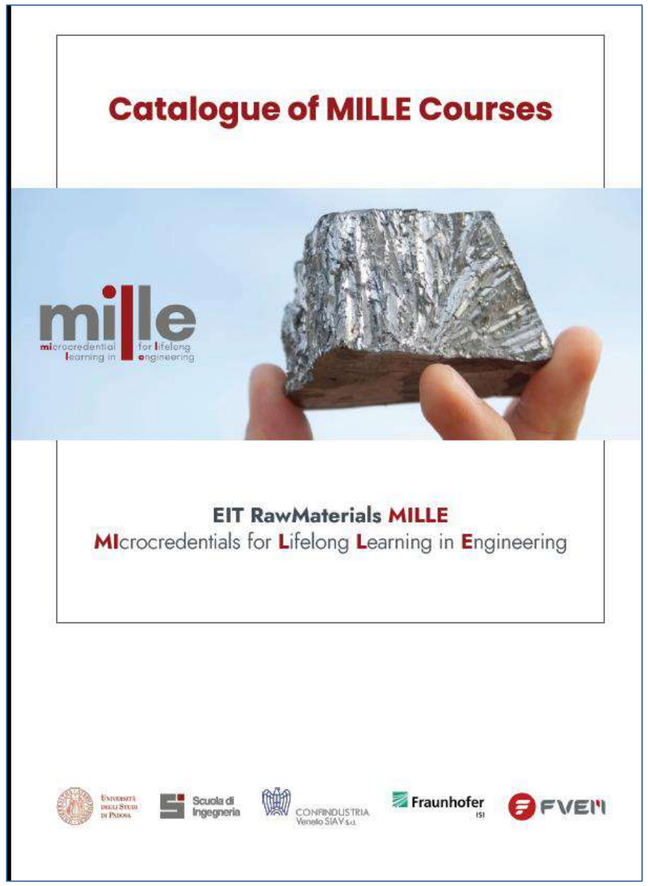
Il Piano Formativo di MILLE

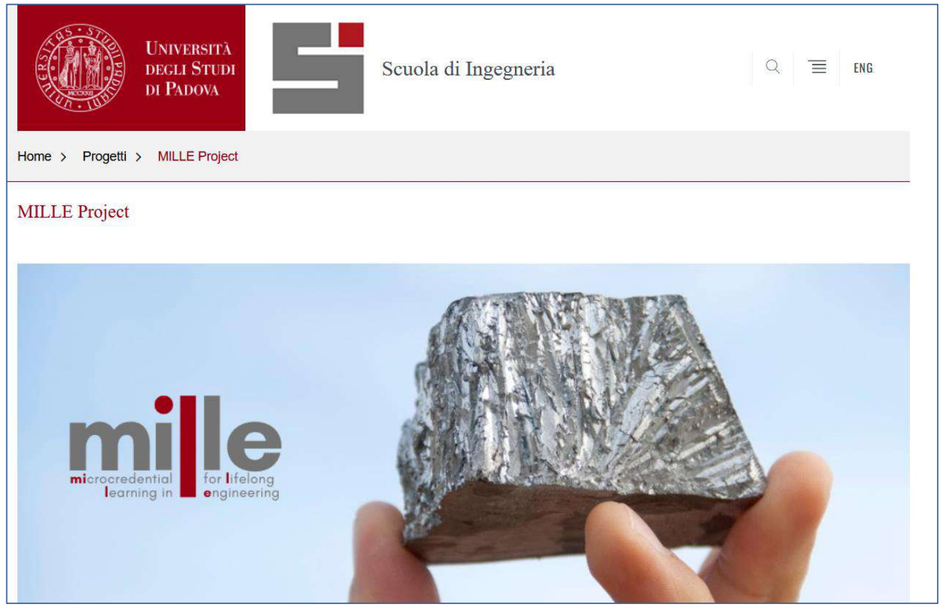
Training Modules



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

Il Piano Formativo di MILLE





https://ingegneria.unipd.it/progetti/mille-project

Il Piano Formativo di MILLE

Basic-level Module 3
Key-descriptors

BM3

Title	**Resource Management & Critical Raw Materials**
LECTURERS	Michaela Schicho, Silvia Gross, Alessandra Lorenzetti
TAGS	Critical Raw Materials, Resources, Recycling, Urban Mining

Details

Preliminary requirements	Scientific or technical basic education. No further requirements.
Module description, including Knowledge & abilities to be achieved	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. Knowledge & abilities to be achieved: recognize and assess CRM and SRM, understanding their technological and economical relevance and the critical issues related to their supply and recovery. Acquire a basic knowledge of main recovery and recycling processes.
Contents of the course	1-3 Introduction to resources management 4-5 Introduction to Critical and Strategic Raw Materials 6 Critical Raw Materials act 7-8 Relevance of raw materials for strategic technologies 9 Supply chain of CRM 10 Mining of CRM and mining charts 11-13 Mitigation measures 14-15 Urban Mining 16 Case Study: Rare earth elements 17 Case study: Lithium 18 Case study: Copper 19-20 Further CRMs 21-24 Recovery of CRM: pyro, hydrometallurgical approaches and alternative approaches

Teaching Methodologies	Asyncronous on-line lectures, 4 nominal hours a week, 2 syncronous meetings with teachers.
References	· https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en. · European Commission, COM (2023) 165 final. · Carrara, S., Bobba, S., Blagoeva, D., Alves Dias, P., Cavalli, A., Georgitzikis, K., Grohol, M., Itul, A., Kuzov, T., Latunussa, C., Lyons, L., Malano, G., Maury, T., Prior Arce, A., Somers, J., Telsnig, T., Veeh, C., Wittmer, D., Black, C., Pennington, D., Christou, M., Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU - A foresight study, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/386650, JRC132889.
Link with Agenda 2030	

RawMaterials Connecting matters

Scuola di Ingegneria

CONFINDUSTRIA Veneto SIAV S.P.A.

Fraunhofer ISI

FVEM

Esempi di Moduli Formativi

S. Gross
DISC, Università di Padova

P. Ferro
DTG, Università di Padova

Proposed modules -CRM

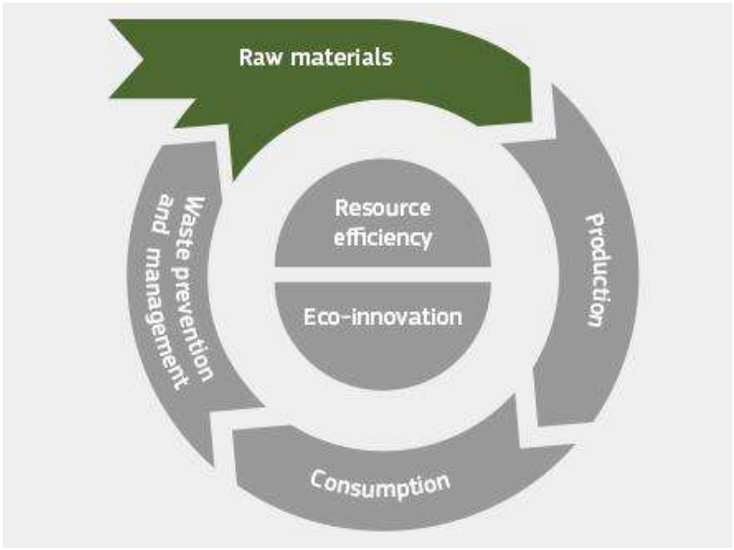
Resource Management & Critical Raw Materials

- Basic Module addressed to Undergraduate professionals (at least 5 years of working experience), with the need of increasing their fundamental knowledge in strategic topics;

- Expert Modules addressed to Senior engineers (8-10 years of professional experience), mainly working in the area of civil or industrial engineering, with the need of improving their knowledge in the topics related to sustainability and critical materials or of re-skilling their competencies;

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Roadmap to a Resource Efficient Europe



The starting points: CRM and the CRM Act (March 2023)

Crtical Raw Materials

Crtical Raw Materials Act, 16th March, 2023

The staring points: CRM and CRM Act

Figure 2: Criticality assessment results (individual materials and grouped HREEs, LRREs and PGMs)

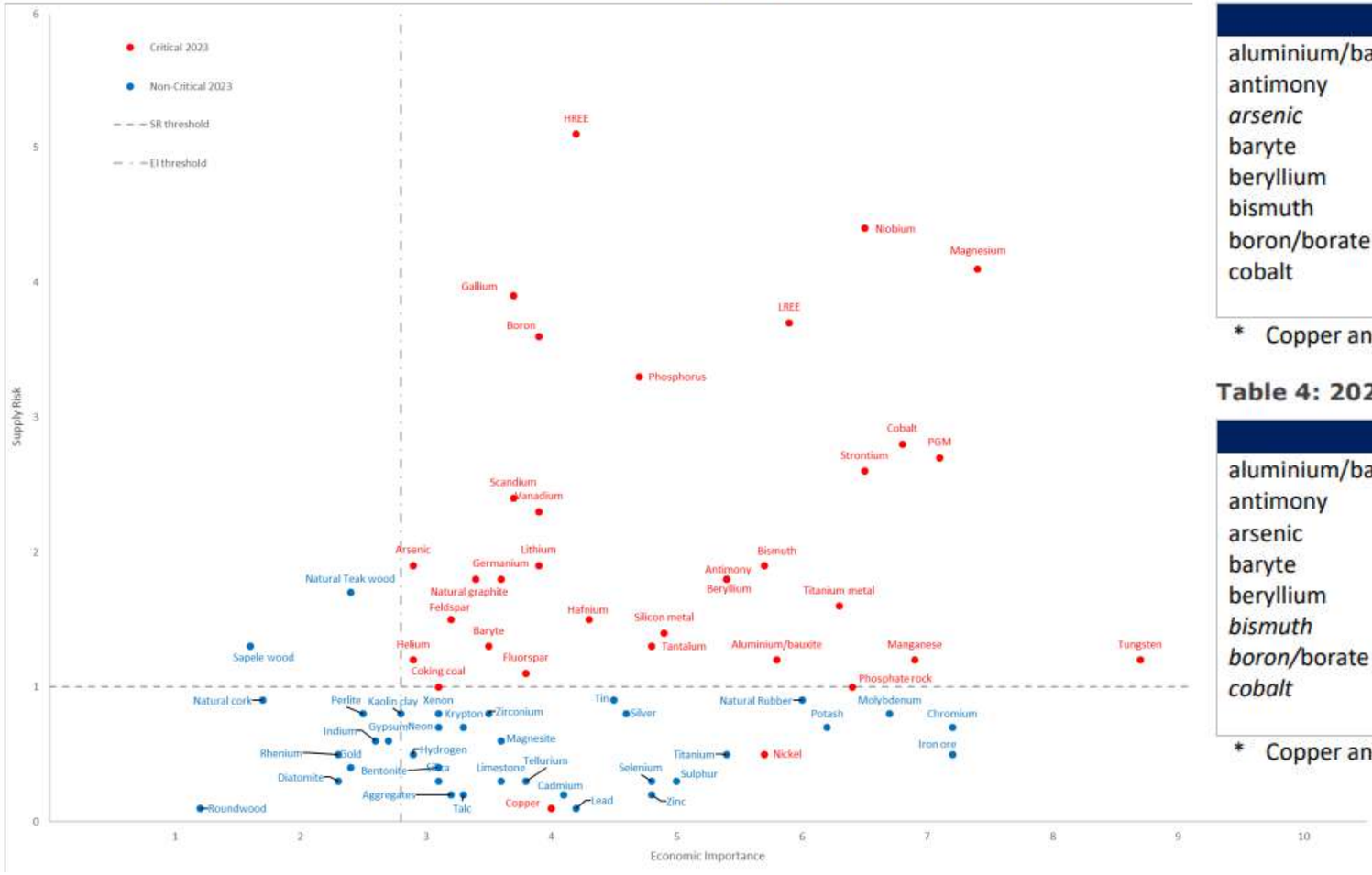


Table 3: 2023 Critical raw materials for the EU

2023 Critical Raw Materials (*new CRMs in italics*)			
aluminium/bauxite	coking coal	lithium	phosphorus
antimony	*feldspar*	LREE	scandium
arsenic	fluorspar	magnesium	silicon metal
baryte	gallium	*manganese*	strontium
beryllium	germanium	natural graphite	tantalum
bismuth	hafnium	niobium	titanium metal
boron/borate	*helium*	PGM	tungsten
cobalt	HREE	phosphate rock	vanadium
		*copper**	*nickel**

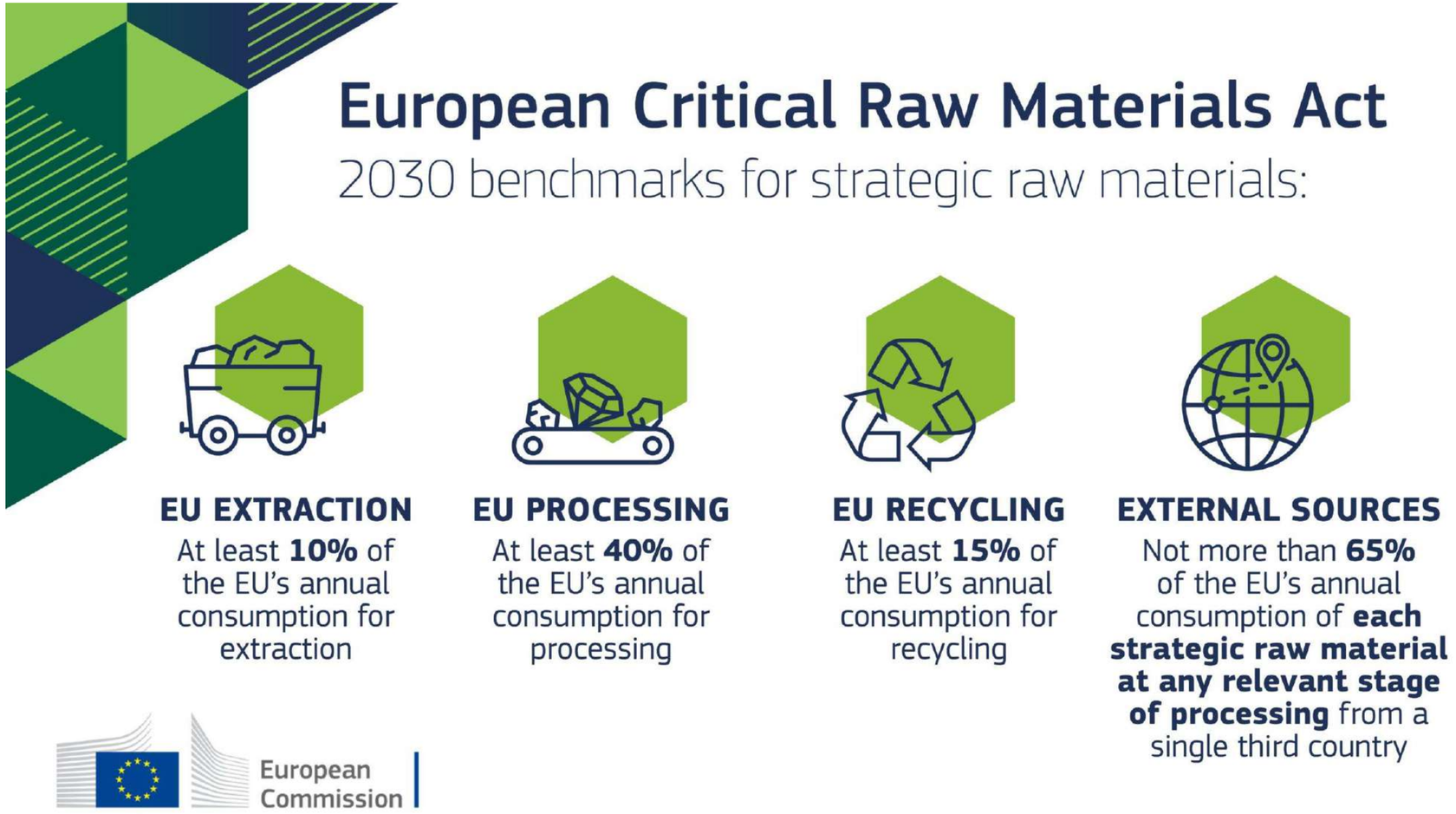
* Copper and Nickel do not meet the CRM thresholds, but are included as SRMs.

Table 4: 2023 Critical raw materials 2023, including Strategic Raw Materials

2023 Critical Raw Materials (*Strategic Raw Materials in italics*)			
aluminium/bauxite	coking coal	*lithium*	phosphorus
antimony	feldspar	LREE	scandium
arsenic	fluorspar	*magnesium*	*silicon metal*
baryte	*gallium*	*manganese*	strontium
beryllium	*germanium*	*natural graphite*	tantalum
bismuth	hafnium	niobium	*titanium metal*
boron/borate	helium	*PGM*	*tungsten*
cobalt	*HREE*	phosphate rock	vanadium
		*copper**	*nickel**

* Copper and Nickel do not meet the CRM thresholds, but are included as SRMs.

The staring points: CRM and CRM Act



- Need for companies to implement industrial policies and production shemes complying with the CrM Act
- Search for resilient and safe supply
- Recovery and recycling of CRM
- Evaluate substitution possibilities
- Train employees on CRM related topics

Module contents (BM and EM)

BM3 MODULE

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.

Knowledge & abilities to be achieved: recognize and assess CRM and SRM, understanding their technological and economical relevance and the critical issues related to their supply and recovery. Acquire a basic knowledge of main recovery and recycling processes.

EM3 MODULE

The EM3 module 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.

Knowledge & abilities to be achieved:
Recognize and assess CRM and SRM, understanding their technological and economical relevance and the critical issues related to their supply and recovery, getting to know mitigation measures. Acquire an advanced knowledge of main recovery and recycling processes.

Module contents (BM and EM)

Module Key-descriptors BM MODULE		
Title	Resource Management & Critical Raw Materials (BM3 – Basic Module)	
TAGS	Critical Raw Materials, Resources, Recycling, Urban Mining	
Details		
Preliminary requirements	Scientific or technical basic education. No further requirements.	
Module description, including Knowledge & abilities to be achieved	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. Knowledge & abilities to be achieved: recognize and assess CRM and SRM, understanding their technological and economical relevance and the critical issues related to their supply and recovery. Aquire a basic knowledge of main recovery and recycling processes.	
Contents of the course	1-3	Introduction to resources management
	4-5	Introduction to Critical and Strategic Raw Materials
	6	Critical Raw Materials act
	7-8	Relevance of raw materials for strategic technologies
	9	Supply chain of CRM
	10	Mining of CRM and mining charts
	11-13	Mitigation measures
	14-15	Urban Mining
	16	Case Study: Rare earth elements
	17	Case study: Lithium
	18	Case study: Copper
	19-20	Further CRMs
	21-24	Recovery of CRM: pyro, hydrometallurgical approaches and alternative approaches
Teaching Methodologies	A-syncronous on-line lectures, 4 nominal hours a week, 2 syncronous meetings with teachers	

Module Key-descriptors EM MODULE		
Title	Resource Management & Critical Raw Materials (BM3 – Basic Module)	
TAGS	Critical Raw Materials, Strategic Materials, Resources, Recycling, Urban Mining	
Details		
Preliminary requirements	Scientific or technical advanced education in the fields of chemistry, geology, materials sciences, chemical engineering, materials engineering, environmental engineering.	
Module description, including Knowledge & abilities to be achieved	The EM3 module 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. Knowledge & abilities to be achieved: Recognize and assess CRM and SRM, understanding their technological and economical relevance and the critical issues related to their supply and recovery, getting to know mitigation measures. Aquire an advanced knowledge of main recovery and recycling processes.	
Contents of the course	1-2	Introduction to resources management
	3-4	Material Flow Analysis as a tool for resource management
	5	MFA case study: Copper
	6	Introduction to Critical Raw Materials
	7-8	CRM Methodology - Supply risk
	9	CRM Methodology - Economic importance
	10	Critical Raw Materials act
	11-12	Mitigation measures: General
	13-14	Mitigation measures: Substitution
	15	Applications of CRM: Relevance
	16	Applications of CRM: Lithium-ion-batteries
	17-18	Applications of CRM: Rare earth elements
	19-21	Recovery of CRM
	22	Basics of urban mining
	23-24	Social aspects on CRM
Teaching Methodologies	A-syncronous on-line lectures, 4 nominal hours a week, 2 syncronous meetings with teachers	

Contacts

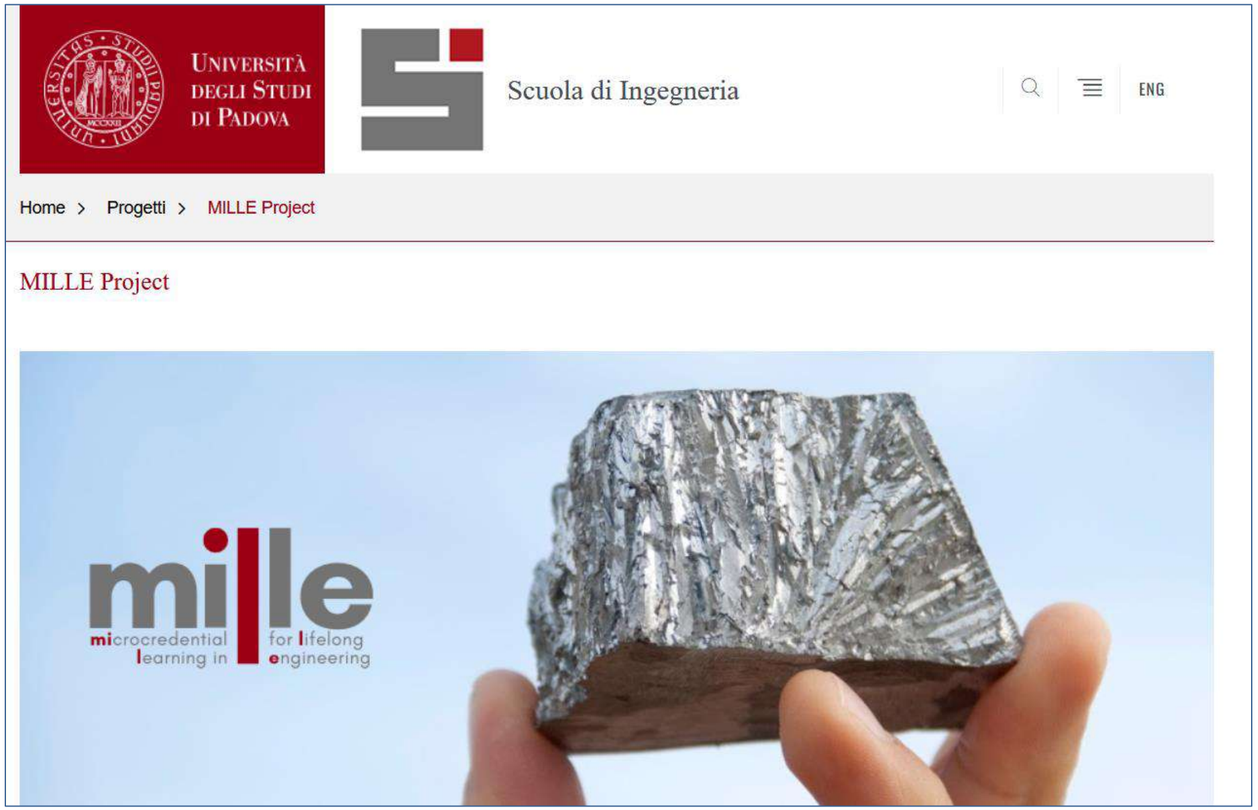
Silvia Gross (referente UniPD modulo CRM)
Dipartimento di Scienze Chimiche
Università degli Studi di Padova
E-mail: silvia.gross@unipd.it
Telefono: 049-8275736
Cellulare: 335-1354833

MILLE e acquisizione delle micro-credenziali

M. Ghisi

Delegata dell'Università di Padova alla formazione permanente

Calendario delle attività



https://ingegneria.unipd.it/progetti/mille-project

Calendario delle attività

- ➔ Corsi disponibili a partire da marzo 2024
- ➔ Moduli da 24 ore
- ➔ Docenza: 50% UNIPD e 50% Fraunhofer Institute
- ➔ Erogazione on-line in una finestra temporale di 3 mesi
- ➔ 3 Meeting periodici con i docenti
- ➔ Verifica + Certificazione (Micro-credenziali)
- ➔ Promozione: sinergie istituzionali
- ➔ Catalogo, dettagli iscrizioni: gennaio 2024

Conclusioni

In **2030**, European citizens will be able to start their learning pathways into and through higher education at any stage in their lifetime.

Micro-credentials will provide learners with rich opportunities to diversify their learning and improve their education by taking shorter courses.

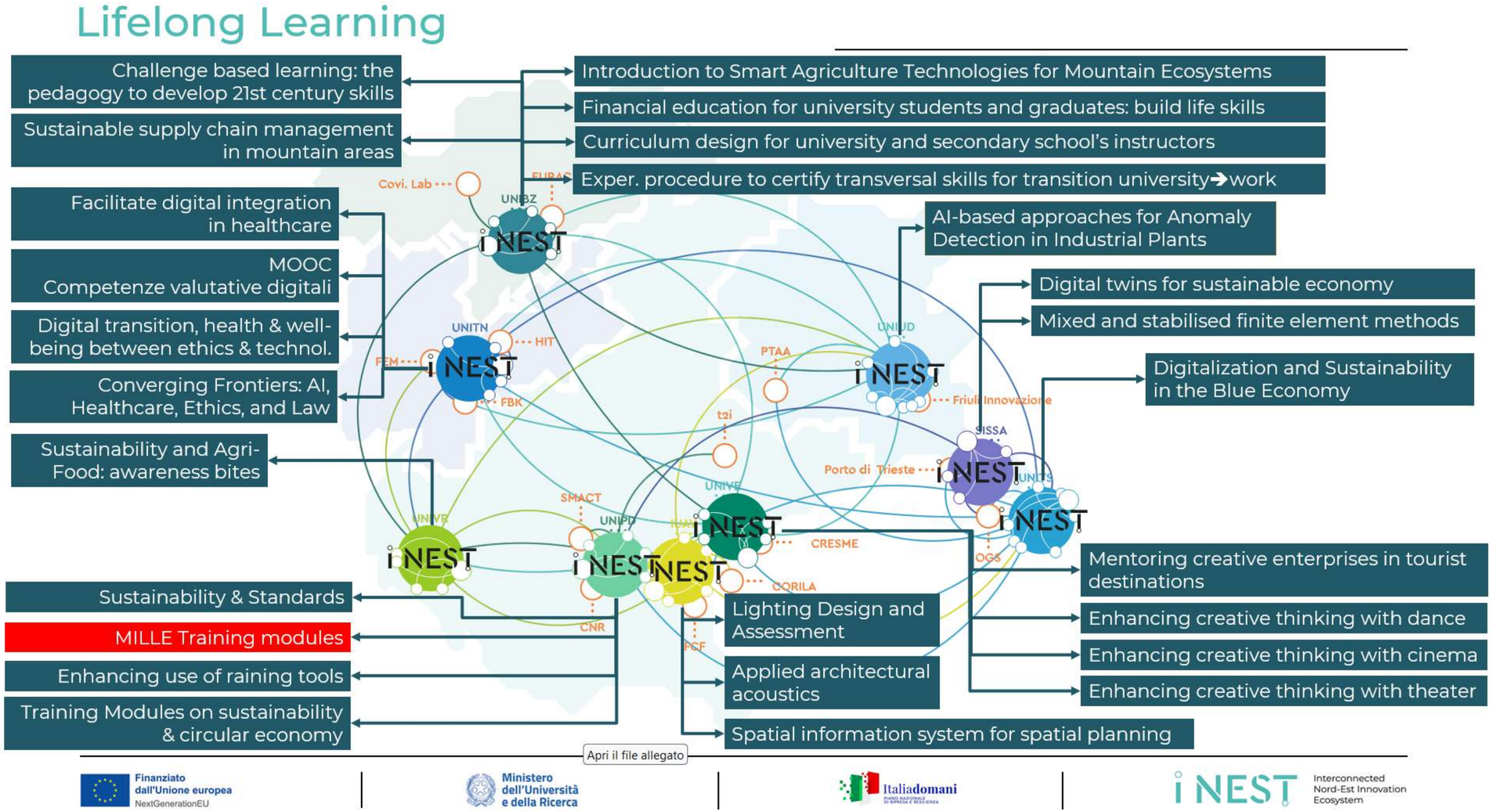
These micro-credentials can be linked thematically and be based on the expertise gained.

Their **alignment to standardised descriptors** (e.g. for professional profiles, skills taxonomies, education level, type of evidence, etc.) will ensure that they are equally understood and recognised by employers, educational establishments across sectors, geographic areas and the wider society.

Through this, micro-credentials will play a major role in encouraging and realising lifelong learning and a society of learning, which will create better lives and better opportunities for all.

Conclusioni e sinergie

INTERCONNECTED NORD-EST
INNOVATION ECOSYSTEM



Calendario delle attività e conclusioni