
eit RawMaterials ACADEMY
Co-funded by the European Union
Raw Materials Value Chain
RaV'eN
RAVEN: Master in Mining Engineering
LAUNCH YOUR CAREER
IN RAW MATERIALS

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Introduction

Our modern lifestyle relies on raw materials. From the iron and steel of our railway infrastructure to the gold and silver in the circuitry of smartphones: raw materials are everywhere. The transition to a climate neutral future requires cobalt for electric vehicles, lithium for rechargeable batteries, silicon for solar panels, and rare earth elements for wind turbines that generate renewable energy.

As the world grows smaller and more hyper-connected, the impact of society on the Earth has never been more visible. It is now clear that we need to shift to a circular economy in order to responsibly use the Earth's finite resources. But what can just one individual do to help? More than you think! Real change requires courage, innovative thinking, and collective action – the same skill set that EIT RawMaterials Academy looks for in prospective students. Are you ready to mine your raw talent, help shape a more circular, green economy, and create sustainable solutions for tomorrow?

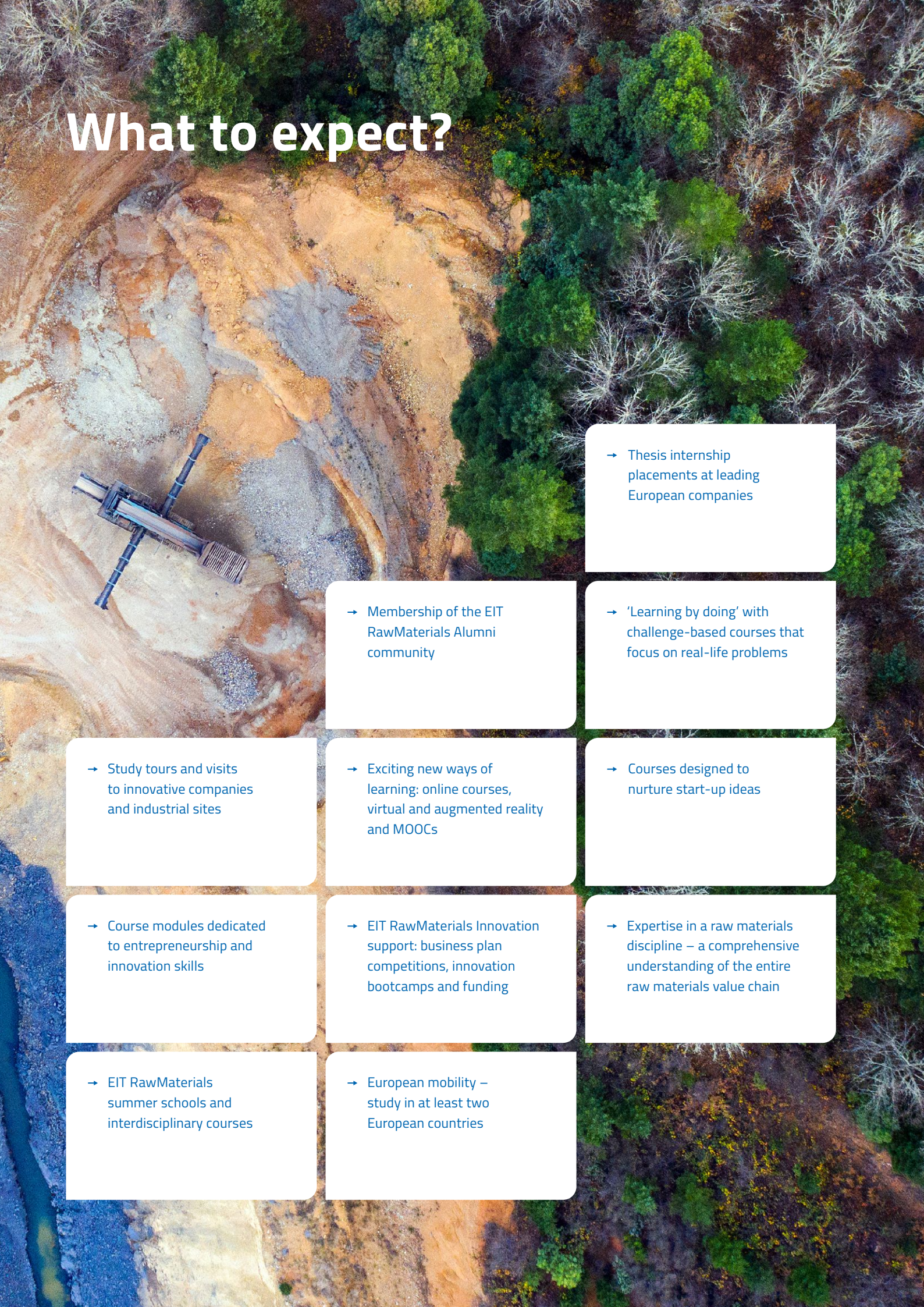
What do we offer students?

EIT RawMaterials Academy offers students a unique opportunity to learn in a dynamic environment, focusing on real-life challenges. Awarded by the EIT (European Institute of Innovation and Technology), a body of the European Union, the EIT Label is a certificate of quality that is granted only to excellent educational programmes at the master's and doctoral level.

As a student of an EIT-Labelled programme from EIT RawMaterials Academy, you'll be part of the largest European raw materials network with more than 300 organisations as partners, including higher education professionals, researchers, and industry experts from over 20 European countries. As an EIT Label student, you will be welcomed into this network and will champion and contribute to the EIT RawMaterials goals of finding new, innovative solutions to secure the sustainable supply of raw materials across the value chain: from exploration, mining and mineral processing to recycling, substitution and a circular economy. EIT RawMaterials aims to equip a new generation of innovators in Europe with the necessary entrepreneurial mind-set for designing and delivering materials solutions. You'll also get the chance to collaborate internationally and develop sustainable solutions to pressing economic, environmental and societal challenges. And long after you graduate, you can stay connected via EIT RawMaterials Alumni.

JOIN AN EIT-LABELLED PROGRAMME AND BECOME A GLOBAL GAME-CHANGER, EQUIPPED WITH THE KNOWLEDGE, SKILLS AND EXPERIENCE EMPLOYERS SEEK.

What to expect?

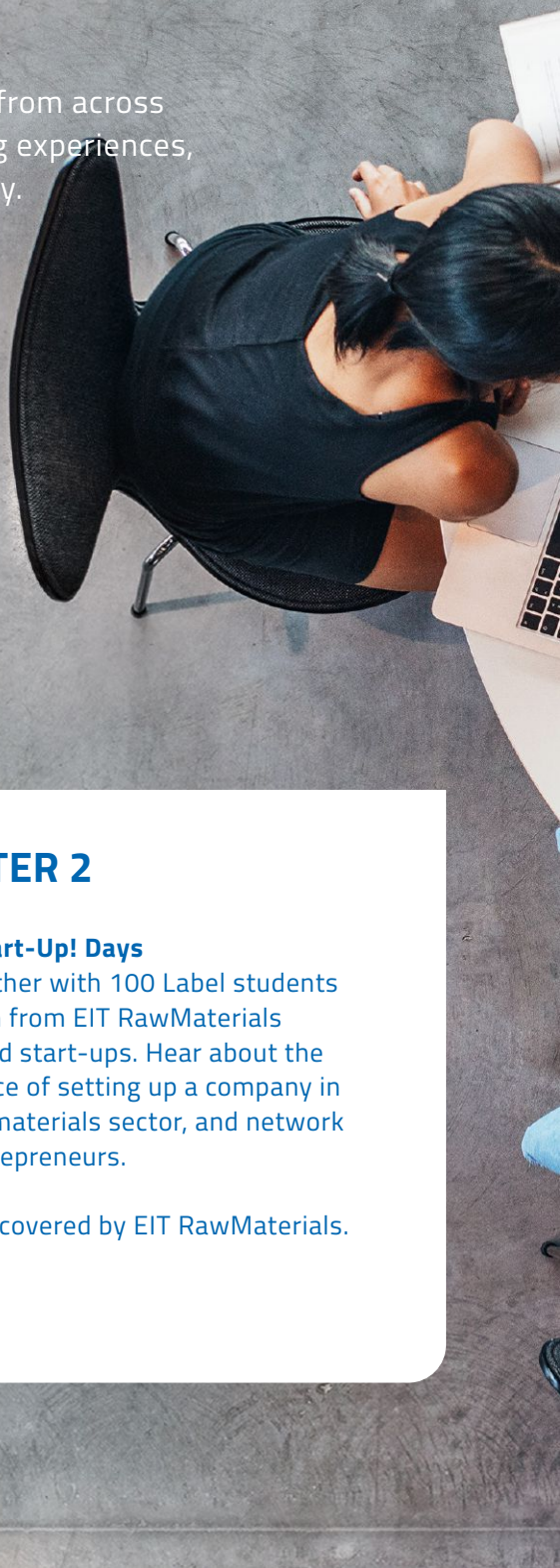


- Thesis internship placements at leading European companies
- Membership of the EIT RawMaterials Alumni community
- 'Learning by doing' with challenge-based courses that focus on real-life problems
- Study tours and visits to innovative companies and industrial sites
- Exciting new ways of learning: online courses, virtual and augmented reality and MOOCs
- Courses designed to nurture start-up ideas
- Course modules dedicated to entrepreneurship and innovation skills
- EIT RawMaterials Innovation support: business plan competitions, innovation bootcamps and funding
- Expertise in a raw materials discipline – a comprehensive understanding of the entire raw materials value chain
- EIT RawMaterials summer schools and interdisciplinary courses
- European mobility – study in at least two European countries

Exclusive activities and support for EIT-Labelled students

Students on EIT-Labelled master's programmes within the EIT RawMaterials Academy receive a range of additional opportunities to boost their innovation and entrepreneurship skills, grow their network in the raw materials sector and gain the experience they need to thrive.

These exclusive events bring together EIT-Labelled students from across the Master School, and form the basis of your shared learning experiences, making you a full member of the EIT RawMaterials community.

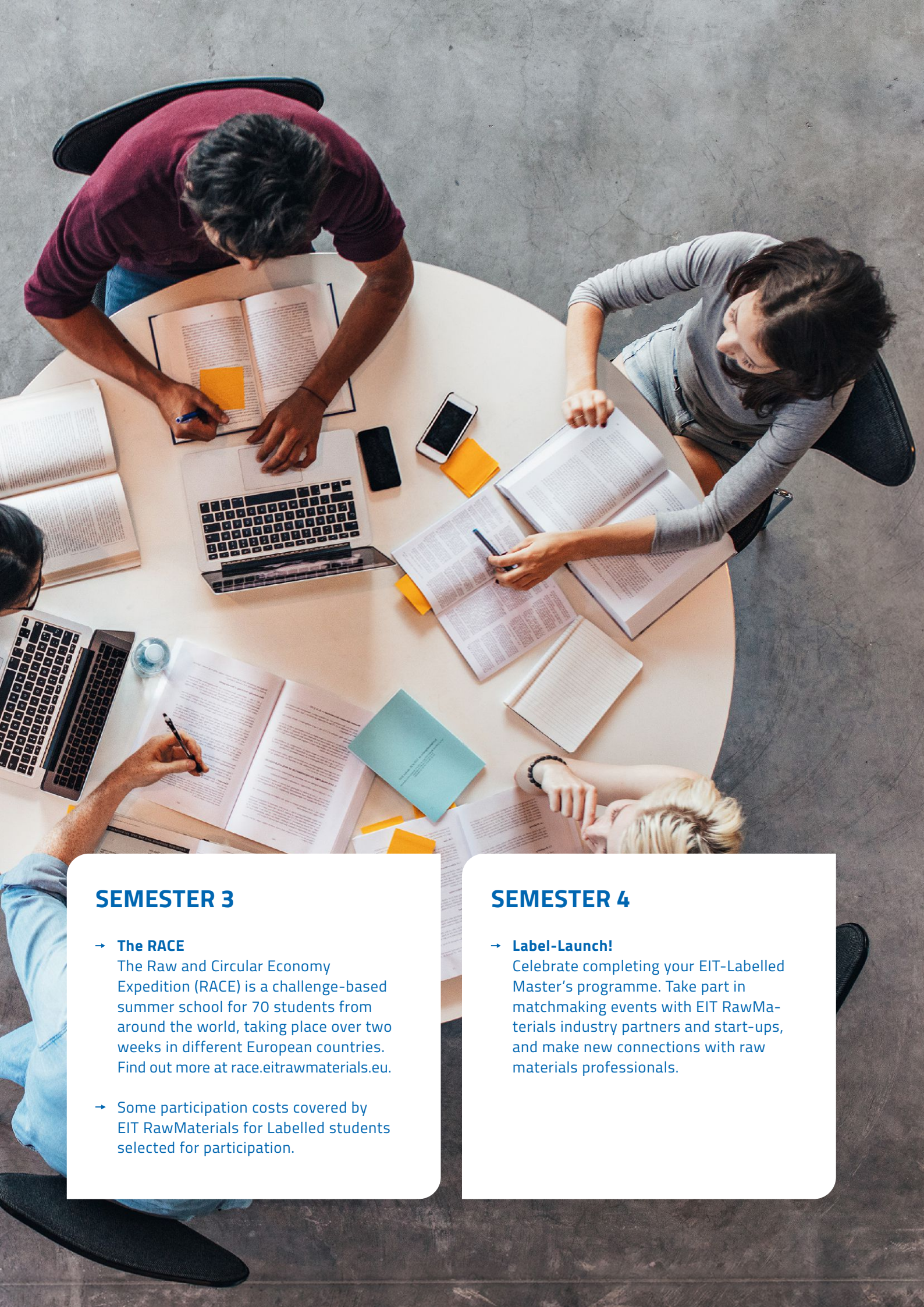


SEMESTER 1

- **Label Induction Days**
  Meet the EIT RawMaterials Academy and learn how to get involved in our community and access the many opportunities on offer. Sign up for EIT RawMaterials Alumni and start growing your network.
- Vote for your representative on the Label Student Board, or stand for election!

SEMESTER 2

- **Label Start-Up! Days**
  Get together with 100 Label students and learn from EIT RawMaterials supported start-ups. Hear about the experience of setting up a company in the raw materials sector, and network with entrepreneurs.
- All costs covered by EIT RawMaterials.



SEMESTER 3

- **The RACE**
  The Raw and Circular Economy Expedition (RACE) is a challenge-based summer school for 70 students from around the world, taking place over two weeks in different European countries. Find out more at race.eitrawmaterials.eu.

- Some participation costs covered by EIT RawMaterials for Labelled students selected for participation.

SEMESTER 4

- **Label-Launch!**
  Celebrate completing your EIT-Labelled Master's programme. Take part in matchmaking events with EIT RawMaterials industry partners and start-ups, and make new connections with raw materials professionals.

Do you have a raw materials business idea?

EIT RawMaterials offers a range of support for individuals and companies with innovative business ideas, including:

Lab2Market

- A three-term entrepreneurship training programme, exclusively for EIT Label students and graduates. Lab2Market will help you come up with a business idea, create a start-up and connect you with investors and customers. Grants are available for selected participants.

EIT Jumpstarter

- One of Europe's top pre-accelerator programmes, to help you develop your business idea and understand what's needed to create a successful start-up.

EIT RawMaterials Accelerator

- A three-stage accelerator programme to help start-ups with a developed product to bring their solution to the market.

Booster Call

- Financial and network access support for start-ups and SMEs in the raw materials sector.

EIT RawMaterials Alumni

From the moment you join an EIT-Labelled Master's programme in the EIT RawMaterials Academy, you are eligible to join EIT RawMaterials Alumni. This organisation provides a great opportunity to connect with the EIT RawMaterials ecosystem and varied EIT RawMaterials activities, such as business idea competitions, start-ups, professional development courses and Master's and PhD programmes.

It is run by and for its members, who can take part in events, and develop their careers through internships and job offers, networking activities and much more, forming a hub for a diverse range of raw materials students, academics and professionals. Furthermore, EIT RawMaterials Alumni provides you with a connection to the wider EIT Alumni community and alumni events around Europe.

Raw Materials Value Chain | RaVeN

RaVeN Master in Mining Engineering

Awarded the EIT Label in 2022

Today's Europe needs a skilled workforce for the raw materials industry, which forms the basis for the development of innovative technologies and industries of the future. The large imbalance between raw material acquisition and consumption that exists in Europe requires a greater commitment to securing supply chains. Such a strategy demands the acquisition of a skilled, entrepreneurial workforce with an awareness of sustainable activities between technology, economics, society and the environment.
The RaVeN EIT-Labelled master's programme in Mining Engineering responds to this challenge by offering an innovative education programme which offers a comprehensive approach to resources with an emphasis on a holistic value chain and on closing the gap between the supply of, and demand for, raw materials. The objective will be pursued along an active learning path involving students and looking for unconventional solutions that can get us closer to a more self-contained (natural resource re-circulating) and, therefore, more sustainable economy. The three cooperating university partners, representing a broad geographical and cultural spectrum, collaborating with the two sides of the Knowledge Triangle, contribute a combination of expertise and highly entrepreneurial mindsets to the programme.

Double Diploma	Graduates of the RaVeN programme will be awarded diplomas from AGH University of Science and Technology and TU Bergakademie Freiberg. Students will obtain the degree: 1) at AGH UST - magister inżynier; 2) at TUBAF - Master of Science. Graduates will also be awarded the EIT Label Certificate.
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	October
Requirements	Eligible candidates must hold a Bachelor's degree in Geology, Mining Engineering, Mineral Processing, Environmental Engineering, Mechanical Engineering, Metallurgy or similar, as well as proof of English language proficiency. Students holding a bachelor's degree from outside of the core field of engineering can be selected by the decision of the Program Council. The admission criteria are available at ravenmaster.eu
Tuition fees	AGH - No tuition fees apply. A registration fee of 100 PLN will apply to all students. TUBAF – a semester fee of 300€/semester applies for applicants who already hold a master's degree
Application Period	June-September 2024 Detailed information on the recruitment process will be posted at ravenmaster.eu in April 2024.
Scholarships	AVSA scholarships of €15,000 from EIT RawMaterials are available. Information on how EIT Label scholarships are awarded and how to receive them will be made available at ravenproject.eu. For those students who will not be funded by AVSA, national ministerial scholarships can be provided. Additionally, the best students can be awarded academic scholarships for the highest academic achievements. Please refer to the ravenmaster.eu website for information on available scholarships.

"The RaVeN programme bridges the gap in the European raw materials sector's workforce, in the training of skilled, entrepreneurial professionals with an awareness of sustainable activities between technology, economics, society and the environment. I firmly believe that this programme will meet the growing demands of future employers by producing graduates who are entrepreneurial, creative and think out-of-the-box."

— **JOANNA KULCZYCKA PHD, ASSOCIATE PROFESSOR, AGH**

PARTICIPATING UNIVERSITIES

AGH University of Science and Technology
Poland
TU Bergakademie Freiberg
Germany
Technical University of Košice
Slovakia

FOR MORE INFORMATION

Faculty of Civil Engineering and Resources Management, AGH University of Science and Technology
Al. Mickiewicza 30, budynek A4,
Kraków, Poland

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Professor Arkadiusz Kustra
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Programme Structure

The RaVeN is a new two-year Mining Engineering MSc. degree scheme.

YEAR 1

SEMESTER 1 (31 ECTS)
AGH UST

- Business training and general trends in the raw materials value chain
- Sustainable exploration of deposits and modern geological technologies for their identification
- The challenges of mining activities in the world
- New trends in mining technologies and mineral processing
- Problems in post mining areas - water management, reclamation, revitalisation
- Energy efficiency - sustainable sources of energy under renewables requirements
- Modern and innovative machines and mining methods used in raw materials excavation
- Economics and Managerial Finance in raw materials
- Statistical tools and data exploration for digitalisation
- Social effectiveness in raw materials management
- Social aspects of sustainable development
- Environmental engineering
- Structures and organisational aspects of lean production
- Business models for sustainable markets
- Sustainable effectiveness of processes in circular economy

SEMESTER 2 (29 ECTS)
AGH UST

- Innovative processes for circular economy in the non-ferrous metals industry
- Modern technologies in Mineral Processing
- Metallurgical industry development
- Materials science and engineering innovation
- Innovation management and entrepreneurship
- Summer school
- Lean production in advanced material development
- The quality management of production processes Eco designing products for circular economy
- Reporting on the SDGs
- English – B2 level

YEAR 2

SEMESTER 3 (33 ECTS)
TUBAF

- Hydrogeology for GW-Management
- Radioactivity
- Reclamation
- Environmental geotechnics
- Management and finance of mining operations along the life cycle
- Licensing, stakeholder involvement and expectations management
- Project and contract management

SEMESTER 2 (29 ECTS)
AGH UST

- Industrial practices
- Master thesis
- Seminars
- Data reporting spreadsheets with SQL queries
- Business management and economic efficiency

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STUDY PROGRAMME

The strength of the RaVeN programme is its innovative approach to teaching through an active learning path by integrating academia, industry and research along the raw materials value chain through the involvement of non-academic experts, mobility exchanges, industry and start-ups. Visit ravenproject.eu to explore the full RaVeN study programme.

PROFESSIONAL PROFILES AFTER GRADUATION

The RaVeN master's degree programme will prepare students with the hard and soft skills needed to understand and solve complex problems related to the entire raw materials value chain. The training and knowledge offered by the programme will offer an advantage for future professionals in the sector, as it focuses on key steps of the value chain that are lacking in the current education portfolio in Europe. The programme is designed to prepare students with up-to-date specialised practical knowledge on the sustainable exploitation of raw materials throughout the value chain: sourcing, processing, use, recycling, and back to sourcing. In addition, the RaVeN MSc fosters creativity, innovation and entrepreneurship, preparing graduates to implement innovative solutions at their workplaces, or to start and run their businesses successfully. Through the programme, students will become technical experts in the field of raw materials, being aware of sustainability,and gaining a holistic view of the value chain and processes. Graduates' skills and knowledge will be highly valued in the mining and processing, metallurgy, energy, automotive and logistics sectors.

RAW MATERIALS VALUE CHAIN SOLUTIONS WITH RAVEN

The curriculum is designed to equip participants with expertise in sustainable extraction, processing and end-use of raw materials. The comprehensive approach of combining academic and expert knowledge will translate into awareness of, and concern for, the raw materials value chain sector in Europe. The process of knowledge acquisition will be carried out with close co-operation with a broad spectrum of stakeholders - including SMEs and large corporations. In addition, the study programme will lead participants towards "circular thinking", bridging of the raw materials gap with zero-waste policies that will be discussed during academic lectures as well as meetings with the industry.

ARE YOU A STUDENT WHO IS:

- **Wanting to contribute to securing raw materials supply?**
- **Keen to gain expertise over the entire raw materials value chain?**
- **Motivated to acquire entrepreneurship skills and start your own business?**
- **Willing to support and contribute to the design of products and services for the circular economy?**

VISIT RAVENMASTER.EU TO FIND OUT MORE AND APPLY

Programmes

Nine Master's programmes within the EIT RawMaterials Academy hold the EIT Label. Graduates from all EIT-Labelled programmes are awarded a degree from one or more of the participating universities, with an EIT Label Certificate confirming graduation from an EIT-Labelled programme.

AMIR

Master in Advanced Materials: Innovative Recycling

AMIS

Master in Advanced Materials for Innovation and Sustainability

EMerald

Master in Georesources Engineering (Innovative Education in Geometallurgy and Circular Economy)

MEITIM

Master in Entrepreneurship, Innovation and Technology Integration in Mining

RaVeN

Master in Mining Engineering

SINReM

International Master of Science in Sustainable and Innovative Natural Resource Management

SUMA

Master in Sustainable Materials

TIMREX

Master in Mineral Exploration

Labelled by:

European Institute of Innovation & Technology

A body of the European Union

Supported by:

RawMaterials ACADEMY

Co-funded by the European Union

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