



The EIT-Labelled Master Programmes

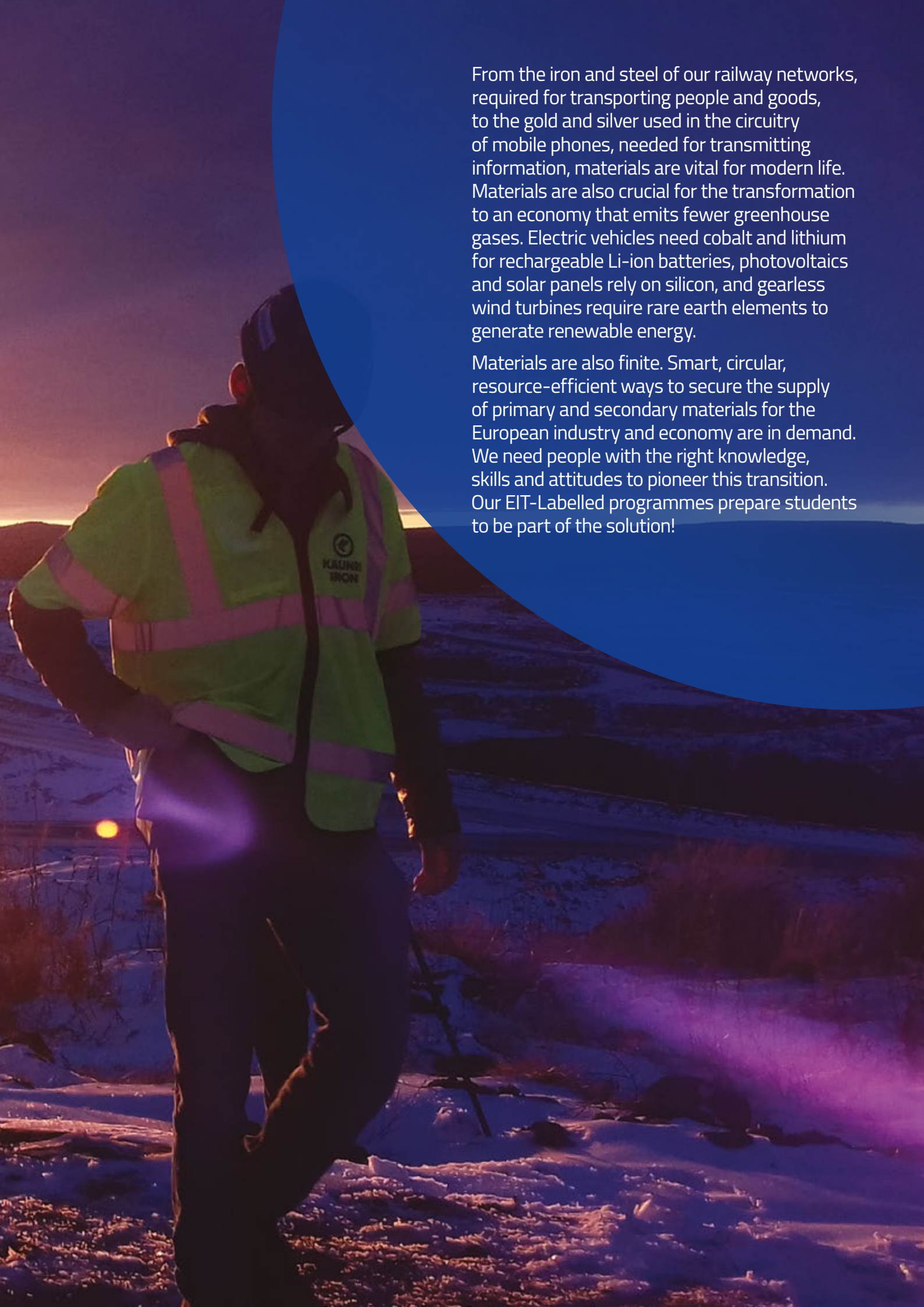
Launch your career in raw materials



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From the iron and steel of our railway networks, required for transporting people and goods, to the gold and silver used in the circuitry of mobile phones, needed for transmitting information, materials are vital for modern life. Materials are also crucial for the transformation to an economy that emits fewer greenhouse gases. Electric vehicles need cobalt and lithium for rechargeable Li-ion batteries, photovoltaics and solar panels rely on silicon, and gearless wind turbines require rare earth elements to generate renewable energy.

Materials are also finite. Smart, circular, resource-efficient ways to secure the supply of primary and secondary materials for the European industry and economy are in demand. We need people with the right knowledge, skills and attitudes to pioneer this transition. Our EIT-Labelled programmes prepare students to be part of the solution!

EIT RawMaterials Academy is able to offer students a unique opportunity to learn in a dynamic environment, focusing on real-life challenges.

EIT RawMaterials is initiated and funded 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 awarded only to excellent educational programmes at the Master and Doctoral level.

As a student of an EIT-Labelled programme, you'll be part of the largest European raw materials network – with more than 120 core and associate partners and 180 project partners from more than 20 European countries coming from higher education, research institutions and industry. As an EIT Label student, you will have the opportunity to become part of this committed partnership as well as 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 extraction, to mineral processing, recycling and moving towards a circular economy.

EIT RawMaterials aims to raise a new generation of innovators in Europe equipped with the necessary entrepreneurial mindset for designing and delivering solutions. You'll also get the chance to collaborate internationally, developing sustainable solutions to pressing economic, environmental and societal challenges.

Join an EIT-Labelled programme and become a global game-changer, obtaining the knowledge, skills and experience employers are seeking out in future graduates, and becoming part of the RawMaterials Academy Label student and Alumni community.

Our EIT-Labelled programmes offer you



Introduction

Seven Education programmes within the EIT RawMaterials Academy have been awarded the EIT Label

Six Master programmes

AMIR

Master in Advanced Materials:
Innovative Recycling

AMIS

Master in Advanced Materials for Innovation
and Sustainability

EMC

European Mining Course

EMerald

EMerald Master in Resources Engineering
(Innovative Education in Geometallurgy
and Circular Economy)

SINReM

International Master of Science in
Sustainable and Innovative Natural
Resource Management

SUMA

Master in Sustainable Materials

One Doctoral Programme

IDS-FunMat-INNO

International Doctoral School
in Functional Materials

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

Awarded the EIT Label in 2018

The Challenge

Materials are the building blocks of the modern global economy and are instrumental for the transition to a green, circular economy which emits less CO₂. Twenty-seven of these materials of these materials have been defined by the EU as critical, meaning that they combine high importance to the EU economy with a high risk associated with their supply. Accessing the known primary raw material sources has become more challenging, while the amounts of industrial waste and end-of-life-products are rapidly increasing. These waste streams contain secondary raw materials, many of which are critical and can be recovered, diversifying supply and contributing to meeting increasing materials demands.

To strengthen raw material supply for a growing global population with increasing welfare, increasing recycling rates can contribute. For this to happen, skilled professionals with advanced technical knowledge of recycling, an understanding of the full raw materials value chain and the skills required to transform knowledge into solutions and business, are in demand. The AMIR Master programme was created to fulfil this need by educating future international professionals who will develop new routes for materials recycling.

Master in Advanced Materials: Innovative Recycling

Awarded the EIT Label in 2018

Diploma	<p>Graduates of the AMIR programme will be awarded a single or double Master of Science degree, depending upon their chosen pathway.</p> <p>Graduates will also be awarded the EIT Label Certificate.</p>
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	September
Requirements	The programme is aimed at candidates who have a Bachelor degree in Engineering and Environmental Sciences with advanced knowledge in Chemistry (minimum 3 years of study or 180 ECTS credits), or a Bachelor degree in Chemistry, Physical-Chemistry, Materials (or Matter) Sciences. Candidates must also demonstrate English language proficiency.
Tuition fees	Please consult the AMIR website (www.amir-master.com)
Application Period	Check www.amir-master.com for details
Scholarships	<p>For students beginning in September 2020, EIT Label scholarships from EIT RawMaterials of €13,500 per eligible student are available. For information on how EIT Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: amir-master@eitrawmaterials.eu.</p> <p>Additional scholarships and grants may be available – visit www.amir-master.com for details.</p>

"I chose AMIR because I want to help change the unsustainable lifestyle that causes high environmental impacts, without compromising economic stability. When I finish the Master, I want to find a job in an R&D department of an important company, able to produce important changes."

Ricardo, Spain

Participating Universities

University of Bordeaux
France

NOVA University Lisbon
Portugal

TU Darmstadt
Germany

University of Liège
Belgium

Polytechnic University of Madrid
Spain

University of Miskolc
Hungary

AMIR: Master in Advanced Materials: Innovative Recycling

The AMIR Master programme focuses on the raw material value chain, with particular emphasis on recycling. The two main objectives of the programme are:

- To educate students to become highly-skilled European professionals with expertise in various types of materials. This expertise will enable them to develop, on a large and ambitious scale, new methods for materials recycling. In addition, the AMIR programme includes classes on transversal skills such as innovation, ethics, intellectual property, life cycle assessment, sustainability and advanced research strategies.
- To develop a deep entrepreneurship mindset among students with the help and expertise of associated businesses, incubators and innovation services as well as a large panel of industries.

AMIR students benefit from a high-level education and research environment including access to advanced research laboratories. High-quality internships, together with mandatory international and intersectoral mobility, ensure that students gain the practical experience and skills necessary to make a difference as a recycling professional.

The curriculum of AMIR was designed with the strategic goal of producing T-shaped professionals and entrepreneurs for the raw materials sector with:

- solid knowledge of the properties and processing of various types of materials (metals, minerals ceramics, polymers), based on multidisciplinary training by physicists, chemists, process engineers, and others.

- in-depth proficiency in recycling, material chain optimisation for end-of-life products, and design of products and services for the circular economy.
- an entrepreneurial mindset, formed with the help and expertise of partners from industry and Research and Technology Organisations (RTOs), as well as associated business and incubators.
- essential transferable skills for researchers such as intellectual property, research ethics and scientific communication.

Programme structure

The first year of the Master programme takes place at the University of Bordeaux or NOVA University Lisbon. Students learn about general and technical aspects of the raw materials value chain (general chemistry, material science, the lifecycle of materials), as well as about the main learning outcomes expected from an EIT-Labelled programme: sustainability, intellectual transformation, value judgments (ethical, scientific and sustainability challenges), creativity, innovation, leadership and entrepreneurship.

The second year takes place at one of the partner universities, allowing students to gain specialist knowledge in their area of interest. This is followed by an industrial internship and completion of the Master thesis.

Year 1 — Materials, recycling and entrepreneurship

Semester 1 & 2
University of Bordeaux

Materials, recycling and entrepreneurship

Semester 1 & 2
NOVA University Lisbon

Materials, recycling and entrepreneurship

See full module details here: www.amir-master.com

Year 2 — Specialisation

Semester 3
TU Darmstadt

Material design for recycling

Semester 3
University of Liège

Metallurgy and metals recycling

Semester 3
Polytechnic University of Madrid

Mineral recycling for construction and other sectors

Semester 3
University of Miskolc

Polymers, hybrids and composite recycling.

Semester 4
Industrial or Academic Partner

Industrial internship (15 ECTS)
Master thesis (15 ECTS)

See full module details here: www.amir-master.com

Master in Advanced Materials: Innovative Recycling

Awarded the EIT Label in 2018



Innovation and Entrepreneurship Training

As an EIT-Labelled programme, the AMIR Master integrates high-level training on entrepreneurship and innovation into its curriculum, giving students the skills that they need to become game-changers in the recycling sector.

- During year 1, the Leading Innovation and Entrepreneurship module focuses on market/customer orientation and cooperation with stakeholders. You will learn to develop and apply Customer/User focus thinking as well as how to identify and cooperate with stakeholders. The objective is to train the entrepreneurs of tomorrow, able to create innovative projects, understand problems, detect needs and devise solutions.
- The University of Bordeaux works closely with the incubator 'IRA' and with the technology transfer organisation 'AST'. These are open to AMIR students and interact closely with the university's laboratories, in which all AMIR students spend 8 weeks during internships.
- Industrial seminars allow AMIR students to learn directly from some of the most important industries in the sector. For example, the French Alternative Energies and Atomic Energy Commission; ArcelorMittal, the world's largest steel producer and one of the main actors in metal recycling; and Veolia, a world leader in water, waste and energy management.
- Industry internships give AMIR students up to six months of experience with an industrial or research partner, gaining extensive real-life experience in research or industry. Partners include Arkema, ArcelorMittal, Veolia and Fraunhofer, ensuring that students gain the top-level experience necessary for success in finding employment or becoming an entrepreneur on completion of their studies.

Professional profiles after graduation

Are you a student who is:

- Interested in the full value chain of raw materials?
- Keen to make a difference in confronting the challenges surrounding waste, and to contribute to the development of sustainable solutions to these challenges?
- Motivated to spend time working with top companies and research organisations in the recycling sector?
- Driven to become an entrepreneur or intrapreneur who makes innovation happen?

Graduates of the AMIR programme will be fully equipped to take on professional roles in the recycling sector:

- Process optimisation
- Materials design
- Plant administration
- Project administration

Furthermore, the skills gained are widely required across sectors, including information and communication technologies, building construction, energy, machinery tools, and mobility. Graduates also obtain the necessary skills and knowledge to set up their own company or work in sales and marketing.

Finally, doctoral studies are another possibility, and graduates of the AMIR programme will be fully equipped to enter PhD programmes in the recycling sector to pursue engineering careers or academic research.

For more information:

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www.amir-master.com

Master in Advanced Materials for Innovation and Sustainability

Awarded the EIT Label in 2016

The Challenge

As global and EU populations increase along with well-being and welfare, consumption per capita is also increasing. In the EU especially, consumption has outpaced production, particularly with respect to the more complicated, resource-intensive technologies and products that have become part of daily life. As a result, the importance of recycling and the circular economy will continue to increase in order to diversify our sources of supply and meet our needs.

AMIS is a Master programme in Advanced Materials for Innovation and Sustainability. The primary objective of the programme is to provide students with an understanding of the full raw materials value chain and a mindset for innovation and entrepreneurship focusing on sustainability. AMIS tackles this challenge by focusing on three themes – all of which are central themes of EIT RawMaterials:

- Substitution of critical or toxic materials in products and for optimised performance
- Material chain optimisation for end-of-life products
- Product and services design for the circular economy

AMIS focuses primarily on metal and mineral raw materials. However, bio-base and polymer materials are covered in terms of their substitution potential, as well as other materials in the context of multi-material product recycling.

AMIS aims to train T-shaped professionals – experts in a particular raw materials discipline with an overview of the entire raw materials value chain. T-shaped professionals also work closely with industry to explore how innovation and entrepreneurship can strengthen the market uptake of raw materials solutions.

Through the programme, AMIS students will become experts in the field of raw materials, particularly in sustainable functional materials, while gaining a holistic view on the value and process chain.

Master in Advanced Materials for Innovation and Sustainability

Awarded the EIT Label in 2016

Double Diploma	<p>From two of the following:</p> <ul style="list-style-type: none"> – Grenoble INP: Master Science et Génie des Matériaux – Aalto University: Master of Science (Technology) – TU Darmstadt: Master of Science in Materials or Master of Science in Physics or Chemistry – University of Bordeaux: Master Sciences et Technologies, mention CHIMIE, spécialité Synthèse et Propriétés des Matériaux Inorganiques – FAME Hybrids and Ceramics – University of Liège: Master Science Physiques or Master Sciences Chimiques – EIT Label Certificate
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	September
Requirements	Eligible candidates must have a Bachelor degree in Science, Technology or Engineering (Physics, Chemistry, Materials Science) or its equivalent, as well as an English language certificate.
Tuition fees	<p>EU students 2019: €1,000/year</p> <p>Non-EU students 2019: €8,000/year</p> <p>Check amis-master.eitrawmaterials.eu for up-to-date information.</p>
Application Period	<p>1st round: 1 October 2019 – 31 January 2020</p> <p>2nd round: 1 February 2020 – 30 April 2020</p>
Scholarships	<p>For students beginning in September 2020, EIT Label scholarships from EIT RawMaterials of €13,500 per eligible student are available. For information on how EIT Label scholarships will be awarded and who is eligible, please contact the coordinating university directly:</p> <p>contact@amis-master.eu</p>

"I chose the AMIS Master because it gives me the opportunity to spend one year of my Master degree at a university in another European country, and I also really like the ideas about future orientation, innovation and sustainability."

Bastian – Germany

Participating Universities

Aalto University
Finland

University of Bordeaux
France

Technische Universität Darmstadt
Germany

Grenoble INP
France

University of Liège
Belgium

Programme Structure

AMIS is a two-year programme:

Year 1 takes place at Grenoble INP, Aalto University or TU Darmstadt. Once students have chosen their entry university, AMIS provides a general curriculum in Materials Sciences, including mandatory courses in Advanced Functional Materials and Innovation, Business and Entrepreneurship.

Year 2 is the specialisation year and takes place at one of the five consortium partner universities. Year 2 includes mandatory courses in Advanced Functional Materials with a specialisation in materials interfaces, nanomaterials, ceramics or hybrids, as well as the Master thesis, a research and development experience in material science jointly supervised by home university professors and host non-academic partners. Student mobility is an integrated part of the programme, involving study at two of the five consortium partner universities, depending on your chosen speciality. Year 1 and Year 2 must be taken at universities in different countries.

Mobility AMIS year 1

Track 1

Grenoble INP

Track 2

Aalto University

Track 3

TU Darmstadt

Year 1 (60 ECTS) addresses the following topics:

- Advanced functional materials
- Innovation, business and entrepreneurship
- Project work on business models and commercialisation of technologies
- Non-academic internship

Summer school: developing solutions to industrial challenges

Mobility AMIS year 2

TU Darmstadt

Aalto University

University of Liège

TU Darmstadt

University of Liège

University of Bordeaux

Grenoble INP

Aalto University

University of Liège

University of Bordeaux

Grenoble INP

Year 2 (60 ECTS) addresses the following topics:

- Advanced functional materials with specialisation
- Practical work on industrial challenges using innovation and entrepreneurship
- Specialised approach to business modelling
- Thesis carried out with university and AMIS partners
- Non-academic internship

Darmstadt:
Functional
ceramics

Aalto:
Nanomaterials
and interfaces

Liège:
Nanomaterials
and modelling

Bordeaux:
Advanced
hybrid
materials

Grenoble:
Materials
interfaces

Master in Advanced Materials for Innovation and Sustainability

Awarded the EIT Label in 2016



Innovation and Entrepreneurship Training

Robust entrepreneurship education is a cornerstone of AMIS. Students will have the benefit of well-rounded, hands-on innovation and entrepreneurship training that will equip them for a professional future, including joint collaboration courses with AMIS partners:

- Project-based courses (Inno Projects I and II) focusing on development of business models for the commercialisation process of new technologies
- The one-week intensive summer school working in teams on industry case studies to create new or significantly improved products, services, processes, policies, new business models or jobs
- Inno-mission Internship: work experience in a company or research organisation developing a solution-focused approach by translating innovations into feasible business solutions and the commercialisation of new technologies
- Practical work on various industrial projects integrated with innovation and entrepreneurship content

Throughout the programme, students will have the opportunity to meet with relevant academic contacts in the innovation and entrepreneurship ecosystem as well as non-academic partners (industries, research and training organisations, entrepreneurs) who will also support future career building. The objective is to share best practices to enable learning from their methods and mistakes. If the results of a Master thesis are deemed suitable, AMIS graduates can also expect assistance from partners in setting up a business or spin-off.

Professional Profiles after Graduation

Are you a student who is:

- Interested in sparking innovation in the raw materials sector?
- Keen to become entrepreneurial and start your own company?
- Motivated to find real solutions to environmental and societal challenges?
- Interested in hands-on learning in industry and research companies?

The skills and knowledge AMIS alumni will develop will be highly appreciated by industries in the Materials Science domain or by laboratories, especially in the following sectors: microelectronics, optics, bio-technologies, energy, communication or environment. As a resource engineer, potential career paths include:

Academic career/research: at universities, research institutions, teaching students or in a managerial position. Scientists with high commercialisation awareness, knowledge and competences; someone who can effectively communicate the commercial value of their scientific research.

Resource industry: SMEs in chemistry, exploration, green energy, machinery and plant construction, metal working industry, ceramics, environmental economy (R&D, product development, management, production, marketing and sales). Expert or manager whose actions and decisions influence the innovation output, value creation and performance of the company.

Freelancer and entrepreneur: create your own business or become a consultant.

Wider society: science journalism, consulting, project development and management, advisor to policy makers, administration, specialist agencies, media, etc.

For more information:

Grenoble Institute of Technology
 PHELMA International Relations
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 France

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www.amis-master.eitrawmaterials.eu



EMC

European Mining Course

Awarded the EIT Label in 2017

The Challenge

With a growing world population and increasing global welfare, the demand for most metals and minerals is increasing. At the same time, metal and material markets are not always predictable and ore grades are decreasing over time, making the challenge to identify and extract resources within economies of scale even more complex. Adding to this complexity, awareness of environmental issues is also growing and the world expects resources to be extracted in a responsible manner. It will be up to the mining engineer of the future to operate successfully in this challenging environment.

Due to the rapid evolution of the raw materials sector, mining engineers will be expected to have a command of vital innovation and entrepreneurial competences and skills with a deep understanding of sustainability to address these challenges. The exposure to internationally- and culturally-diverse environments has also become an appealing and desired quality, as globalization is increasingly relevant in all industries, including the mining sector and its extensive supply chains.

European Mining Course

Awarded the EIT Label in 2017

Diploma	Master of Science – Joint Triple degree from Delft University of Technology (TU Delft), RWTH Aachen University and Aalto University. – EIT Label Certificate
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	September
Requirements	A Bachelor degree of at least 180 ECTS in appropriate subject areas (e.g. engineering, earth sciences, environmental sciences, mineral resources engineering) issued by one of the Partner Universities; or BSc degree or a Bachelor degree of at least 180 ECTS credit points or an equivalent university qualification from other top universities worldwide in appropriate subject areas as mentioned above. Candidates must also demonstrate proficiency in the English language.
Tuition fees	EU/EFTA students 2019: €2,083/year Non EU/EFTA students 2019: €18,750/year For up-to-date fee information visit emc-master.eu
Application Period	15 October to 1 April annually
Scholarships	For students beginning in September 2020, EIT Label scholarships from EIT RawMaterials of €13,500 per eligible student are available. For information on how EIT Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: emmep@tudelft.nl

“One thing I particularly like about the EMC is that the different unis each have their own specialisation. From hardrock underground and soft rock open pit to the processing steps and financing of mining projects – combine them all together and you gain a great understanding of the whole value chain, from mineral to pure metal.”

Wout – Netherlands

Participating Universities

RWTH Aachen University
Institute of Mineral Resources Engineering
Germany

Aalto University
School of Engineering and School of Chemical Engineering
Finland

Delft University of Technology
Faculty of Civil Engineering and Geosciences
Netherlands

European Mining Course (EMC): Mining engineers of the future

The triple degree Master European Mining Course (EMC) covers every aspect of the life cycle of mineral resources. It is a Master programme designed to provide a solid understanding of the global mining industry and takes a life-cycle approach by covering the entire mining value chain. It offers a state-of-the-art technical basis in resource modelling, mine design and economic evaluation. Technical knowledge is also supplemented with topics on business economics, ethics, environmental engineering and a clearly defined and structured programme for the management of health, safety and environment.

EMC aims to train professionals who will be the future decision-makers and game-changers in the mineral resources and associated engineering trade, with a strong vision of the future developments in this industry. EMC supports the development of students into adaptive, innovative and entrepreneurially-oriented engineers capable of identifying the best approach to obtain optimal value from mineral ore deposits.

Programme Structure

EMC is a two-year programme. Students study for one semester at each of the three universities and move between countries as a group.

The 120 credit points (ECTS) programme starts in the autumn at Aalto University (Finland). After a break, during which students have the opportunity to complete an internship at a company, students move to RWTH Aachen University (Germany) and then continue onto the third semester at TU Delft (the Netherlands). The final semester is spent at one of the three Partner Universities to work on a thesis project, which may be carried out in cooperation with a company. Upon completion students receive a triple degree diploma from each of the three participating universities.

Semester 1	Semester 2	Semester 3	Semester 4
Aalto University	RWTH Aachen University	Delft University of Technology	Thesis
Fundamentals of minerals engineering and recycling (5 ECTS)*	Feasibility studies of mining projects (5 ECTS)	Data analysis and resource modelling (5 ECTS)	Thesis carried out at one of the universities or at a company with support from EMC and EIT RawMaterials (30 ECTS)
Technical innovation project (10 ECTS)*	Reserve modelling and estimation (5 ECTS)	Computer-aided mine design and optimisation (5 ECTS)	
Economic geology and mineral economics (5 ECTS)	Mine design and simulation (5 ECTS)	Legal, health and safety (5 ECTS)	
Rock mechanics (5 ECTS)	Mine ventilation (5 ECTS)	Financial engineering and investment scenarios (5 ECTS)	
Field experience and project in hard rock mining (5 ECTS)	Case study: mining projects (5 ECTS)	Project execution/mine start-up planning (10 ECTS)	
*Component of the circular economy design forum	Mine Waste (5 ECTS)		



European Mining Course

Awarded the EIT Label in 2017



Innovation and Entrepreneurship Training

EMC aims to graduate adaptive, innovative and entrepreneurially-oriented engineers. To that end, innovation and entrepreneurship is embedded throughout the programme in the form of course content, case studies, project work, field trips, and professional contacts and support. Some examples include:

- Courses designed to promote the development of an entrepreneurial mindset of students and the understanding of circular economy, supported by the “Circular Economy Design Forum”, an EIT RawMaterials project, taking place during semester 1 at Aalto University
- Aalto University courses examining the way companies deal with technical challenges in a business environment, including observing how these are experienced hands-on during the “Field Experience and Project in Hard Rock Mining”, which consists of a one-week excursion to different mining operations and equipment manufacturers in Finland
- All EMC students are introduced to YES!Delft, one of the top tech incubators in Europe. The programmes at the YES!Delft Incubator focus on validating and growing promising technologies into successful enterprises
- At TU Delft there are courses on financing mining projects, business modelling, and implementation of optimisation strategies to improve business cases, while at the same time considering the socio-environmental impacts of an optimisation solution
- Lectures involving industry, study tours and site visits to business partners to see real-world operations. Students will also be given the opportunity to obtain industrial internship placements at an EMC programme partner company. Moreover, students are encouraged to carry out their thesis project in cooperation with a company. The process of forging a thesis together enforces your ability to learn and think as an entrepreneur

Professional Profiles after Graduation

Are you a student who is:

- Interested in taking a life-cycle approach to mining solutions?
- Keen to learn vital innovation and entrepreneurial skills that will help you start your own company?
- Motivated to work closely with industry, SMEs and start-ups at three top universities?

Given the worldwide demand for professionals in mining and minerals engineering and management, graduates of EMC have promising career opportunities. EMC graduates will be qualified to work for:

- Mining companies and companies engaged in minerals and metals processing technology
- Companies working on ore deposits and integrated production
- Market leaders in efficient dredging and mining
- Aggregates companies
- Government agencies
- Engineering and consulting firms
- Knowledge institutions, research institutes and think-tanks

Alternatively, the entrepreneurial and innovative skills which you have developed during the programme will help you to set up your own business.

For more information:
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 Geosciences
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www.emc-master.eu



EMerald

Master in Resources Engineering

(Innovative Education in Geometallurgy and Circular Economy)
Awarded the EIT Label in 2016

The Challenge

The EMerald Master programme was created to answer the urgent need expressed by the European Union to create a resource-efficient Europe. As the EU recognised the importance of mineral and metal resources in our modern economy, it also realised that the raw materials industries were facing a critical skills shortage.

The EMerald Master programme aims to train a new generation of engineers with an entrepreneurial mindset and a global vision of the value chain, putting the extraction of mineral and metal resources at the beginning of a circle which ends by collecting end-of-life products and recovering valuable materials out of the urban mines (circular economy). Therefore, the Master course will focus on two aspects:

- Bridging the gap between geological exploration and mineral processing by offering innovative education in geometallurgy
- Helping to close the loop in a resource-efficient way by forming professionals who know the processing challenges and the need to meet targets in terms of recyclability

Master in Resources Engineering

(Innovative Education in Geometallurgy and Circular Economy)

Awarded the EIT Label in 2016

Diploma	<p>The consortium will deliver a triple diploma (one from each university where the student attended lectures) and a Diploma Supplement from the coordinating university:</p> <ul style="list-style-type: none"> – Ingénieur Civil des Mines et Géologue delivered by University of Liège (ULiège) – Master Sciences de la Terre et des Planètes Environnement delivered by University of Lorraine (UL) – Master of Science – Major: Geosciences delivered by Luleå University of Technology (LTU) – Master in Mechanical and Process Engineering delivered by Technische Universität Bergakademie Freiberg (TUBAF) – EIT Label Certificate
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	September
Requirements	<p>Eligible candidates must have a Bachelor degree in Engineering with basic knowledge in Geology or a Bachelor degree in Minerals Engineering, Mining Engineering, Chemical Engineering, Geological Engineering, Metallurgical Engineering or a Master degree in Geology.</p> <p>At least 22.5 ECTS in Mathematics at university level are required. Candidates must also demonstrate proficiency in the English language.</p>
Tuition fees	<p>EU students 2019: €4,500/year Non-EU students 2019: €9,000/year For up-to-date fee information, visit www.em-georesources.eu</p>
Application Period	<p>1 October 2019 – 20 January 2020 for Erasmus Mundus scholarships 1 March 2020 – 30 April 2020 for non-EU self-funded students 1 March 2020 – 30 June 2020 for EU self-funded students</p>
Scholarships	<p>For students beginning in September 2020, EIT Label scholarships from EIT RawMaterials of €13,500 per eligible student are available. For information on how EIT Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: emerald@uliege.be</p> <p>A number of Erasmus Mundus Joint Master Degree scholarships are available, covering full tuition fees and living expenses – visit www.em-georesources.eu for details.</p>

“The EMerald master programme has given me an engineering perspective of the whole raw materials value chain. Being an EIT-Labelled programme, I’ve had opportunity to be part of several EIT RawMaterials-organised events which present extensive opportunities for networking and professional development.”

Ali – Pakistan

Participating Universities

University of Liège
Belgium

University of Lorraine, ENSG Nancy
France

Luleå Institute of Technology
Sweden

TU Bergakademie Freiberg
Germany

Programme Structure

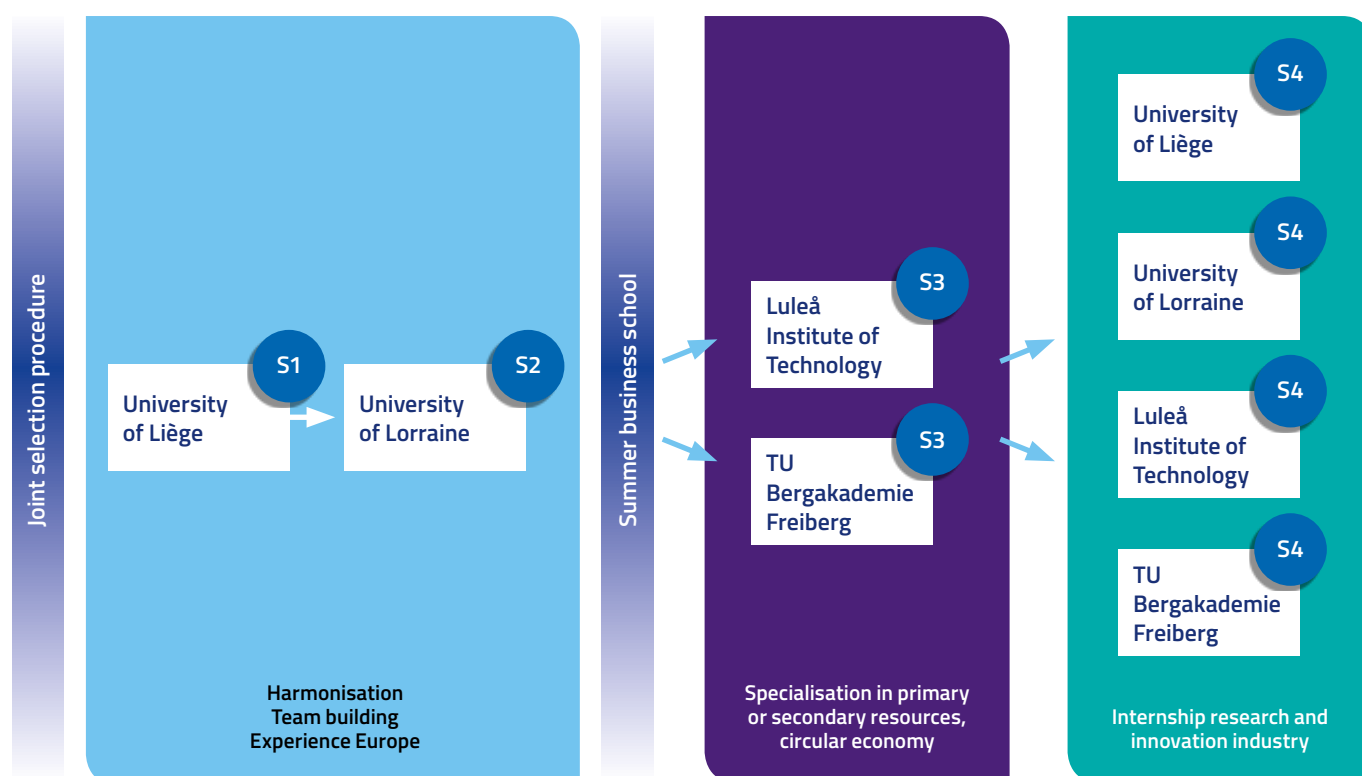
EMerald is organised into four semesters and accounts for 120 ECTS or 30 ECTS per semester.

The first year of the programme aims to harmonise students' knowledge and help them to find the right balance between resources characterisation and modelling, and processing and management techniques (multidisciplinarity). The thematic courses offered by the two universities (ULiège and UL) are complemented by a strong programme to develop transversal skills. Industry experts and invited scholars bring in key contributions on corporate social responsibility, economics, lifecycle analysis and other essential aspects of modern sustainable engineering operations.

All courses offer a blend of theoretical lectures and practical work in the labs. Students often work in groups on a real case study, finding out for themselves possible processing routes for complex ores and waste materials.

The third semester offers students the option to specialise more upstream at LTU (primary resources) or downstream at TUBAF (secondary resources). The final semester can be spent in any of the aforementioned institutions depending on the thesis specialisation. Regardless of the location, the Master thesis will be completed in close collaboration with an industrial partner or a research centre that will also host the students for an internship.

The full catalogue of courses is available on the EMerald website: www.em-georesources.eu



Master in Resources Engineering

(Innovative Education in Geometallurgy and Circular Economy)

Awarded the EIT Label in 2016

Innovation and Entrepreneurship Training

As an EIT-Labelled programme, EMerald aims to graduate interdisciplinary engineers who possess not only a deep knowledge of georesources, but also a holistic view of the entire raw materials value chain and an entrepreneurial, creative mindset.

The EMerald programme:

- Provides you with the opportunity to gain insight into the industrial world and to raise your awareness and understanding of the whole raw materials value chain through professional seminars and technical visits
- Offers many courses targeted to facilitate the acquisition of entrepreneurial skills. You will learn how to work in teams and communicate your results to a broad public. In certain courses you will conduct real case studies from data integration to the estimation of resources, including economic aspects
- Integrates research dimensions with workshops and your Master thesis, as well as possibilities to attend international meetings (e.g. biennial meetings of the SGA), during which you can meet researchers and explore opportunities if you wish to pursue a career in the research field
- Receives support by leading companies who have an advisory role to the programme through a Strategic Advisory Board (SAB), which ensures that the courses of the programme meet their professional expectations

Between the first and the second year, the EMerald master organises a summer business school, a three week intensive course which will take place in Freiberg in August. As an EMerald student, you will get the opportunity to take solid management courses in finance, marketing, business modelling and operations management, providing you with key insights into how engineering solutions can be applied to, and taken up by, society and industry.

Professional Profiles after Graduation

Are you a student who is:

- Interested in sparking innovation in the raw materials sector?
- Keen to become entrepreneurial and start your own company?
- Interested in bridging the gap between geology and metallurgy?
- Curious to acquire understanding of the whole raw materials value chain?
- Motivated to expand your professional network by studying at least three European universities?

The knowledge and skills EMerald graduates gain are highly valued in industry and beyond. Not only are EMerald graduates qualified to work in the fields of mining, building materials (cement, aggregates), non-ferrous metals production, circular economy of metals and mineral chemistry, possible career paths also include working for:

- Geological surveys
- Junior exploration companies
- Investment banks (resources sector)
- Venture capital (resources sector)
- EU Commission (raw materials and industry)
- National/regional governments (mining laws, implementing circular economy, mineral industry)
- EMerald also prepares you for further study (PhD) in mineral processing, geometallurgy, resources/reserves estimation, process development, mineral industry, etc.

For more information:

EMerald administrative coordinator
 Rosalia Fiorentino
 Université de Liège

T : +32 4 366 95 27

E : emerald@uliege.be

www.em-georesources.eu

International Master of Science in Sustainable and Innovative Natural Resource Management

Awarded the EIT Label in 2017

The Challenge

Sustainability is more than just a buzzword. Raw materials are one of the fastest depleting resources on Earth. A steady and sustainable supply of many of these materials is vital for a decarbonising society, renewable energy infrastructure, electric mobility but also consumer products and electronics. The outdated make-take-use-dispose model is no longer valid in a world of finite resources.

In order to deal with this challenge, three leading European universities cooperated to develop a new Erasmus+ Master programme – the International Master of Science in Sustainable and Innovative Natural Resource Management (SINReM). SINReM was created to educate a new generation of professionals who can engineer technology to reinvent materials science, and gain competence, expertise and confidence in developing solutions in the sustainable use of materials.

International Master of Science in Sustainable and Innovative Natural Resource Management

Awarded the EIT Label in 2017

Diploma	Joint diploma of International Master of Science in Sustainable and Innovative Natural Resource Management from Ghent University, TU Freiberg and Uppsala University. – EIT Label Certificate
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	September
Requirements	A Bachelor degree (minimum 180 ECTS) in engineering or science including 15 ECTS in mathematics and/or physics and 10 ECTS in chemistry, or an equivalent qualification from a recognised university or engineering college. Proof of proficiency in English – for detailed requirements, please visit the programme website: sinrem.eu
Tuition fees	European (EEA) 2019: €6,000/year All others 2019: €12,000/year Visit www.sinrem.eu for up-to-date fee information.
Application Period	European (EEA): until 31 May 2020 Non-European: until 28 February 2020
Scholarships	For students beginning in September 2020, EIT Label scholarships from EIT RawMaterials of €13,500 per eligible student are available. For information on how EIT Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: sinrem@ugent.be In addition to EIT scholarships, European students can apply for a (partial) tuition fee waiver. A number of Erasmus Mundus Joint Master Degree scholarships are available, covering full tuition fees and living expenses – visit www.sinrem.eu for details.

Participating Universities

Ghent University
Belgium

TU Bergakademie Freiberg
Germany

Uppsala University
Sweden

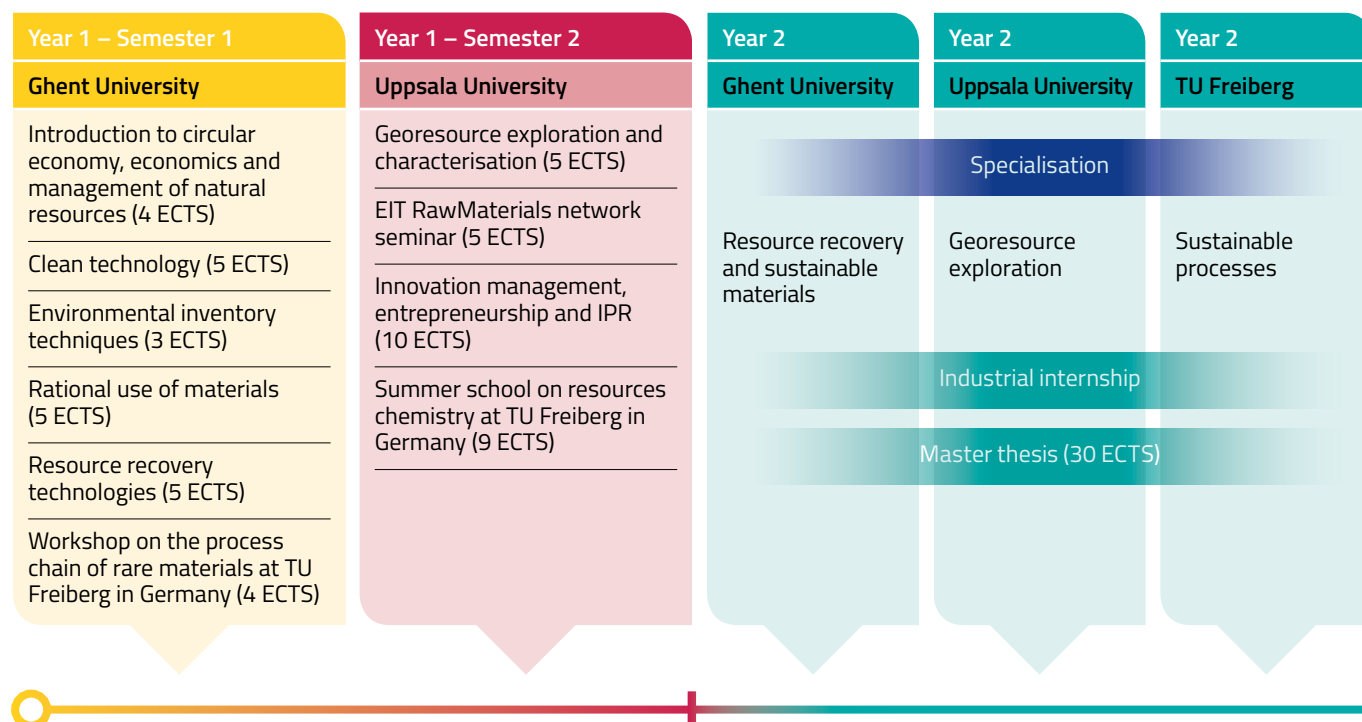
“SINReM provides strong connections with industry from day one. Companies, educational and research institutions with crucial roles in the RM industry support us with lectures, seminars, internships and thesis work to let us know what is going on in the sector.”

Felipe, Chile

SINReM – International Master of Science in Sustainable and Innovative Natural Resource Management

SINReM gives its students a broad view on the entire value chain and its varying aspects, but also its opportunities and limitations. SINReM students acquire knowledge on the different (technological) options for optimising flows of natural resources in the different parts of the value chain, ranging from resource exploration to sustainable materials use and use of resources in production processes to recovery/recycling of resources from end-of-life products.

As part of SINReM, students will work together with peers from diverse backgrounds to carefully assess how to manage the Earth's resources in an economically sustainable way, with no negative environmental and societal impact. Students will instigate a paradigm shift in the industry by developing a holistic view on raw materials processing.



Year 1: Holistic view of the value and process chain

Year 2: Deep understanding of one subject area

International Master of Science in Sustainable and Innovative Natural Resource Management

Awarded the EIT Label in 2017

Innovation and Entrepreneurship Training

SINReM graduates are trained to excel in creativity, have an entrepreneurial mindset, a multidisciplinary view and innovative problem-based technology development skills.

Several integrated courses throughout the programme stimulate the exchange of knowledge and experience between the students, lecturers and non-academic stakeholders who are active in the value chain, and challenge students to develop and apply multi-disciplinary and creative problem-solving techniques.

The SINReM programme also provides complementary skills training to teach students to assess the environmental and societal impact of interventions in the value chain (e.g. resource assessment) and to be creative and innovative not only in an academic research environment, but also in business environments. These courses include a module on innovation management, IPR and entrepreneurship and a course on Project Management and Business Plan Development that prepares the students for their Master thesis research and for the start of a future start-up or spin-off.

Professional Profiles after Graduation

Are you a student who is:

- Interested in exploring how to engineer technologies to improve the use of finite raw materials?
- Keen to learn about how innovation and entrepreneurship competences and skills can position you to contribute both to current industries but also create your own start-up?
- Motivated to work closely with industry and research on developing science-based solutions to pressing challenges?

Entrepreneur – SINReM prepares you to start your own business. You will interact with company founders from the raw materials sector, gain the necessary knowledge and skills for innovation management and IPR, learn to develop and analyse business models and plan how to bring the results of research into application. Industrial partners and the research transfer/business development departments of the three partner universities are also there to support you.

Work in Industry – create a spin-off from an existing company or become a Resource Engineer in research departments or technological departments of small, medium and large companies worldwide.

For more information:

Please find out more information on the SINREM website: sinrem.eu

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www.sinrem.eu



SUMA

Master in Sustainable Materials

Awarded the EIT Label in 2016

The Challenge

Materials provide the foundation of the modern global economy. They are becoming increasingly relevant for the shift to a decarbonising society as they enable the transition to renewable energy, electric mobility and resource efficiency, among others. Nevertheless, many materials are becoming critical.

Therefore, we need to develop robust solutions and game-changing technologies that allow for a sustainable stream of materials.

Master in Sustainable Materials

Awarded the EIT Label in 2016

Diploma	<p>Dual Master of Science degree awarded from two of the following universities:</p> <ul style="list-style-type: none"> – KU Leuven – Montanuniversität Leoben – University of Trento – Grenoble INP – University of Milano-Bicocca <p>EIT Label Certificate</p>
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	September
Requirements	<p>Generally, all students should have: Bachelor of Science or Bachelor of Engineering (or equivalent), as well as proof of English language proficiency.</p> <p>Candidates must meet the admission criteria of the Master's Degree Programmes of both partner institutions of their chosen track. Please refer to the individual entry university websites for information on admission requirements.</p>
Tuition fees	<p>Fees vary based on programme track and country of origin.</p> <p>Total fees for EEA students range from €77 to €5,500. Total fees for non-EEA students range from €600 to €12,000.</p> <p>Visit www.master-suma.eu/study/#paths for details</p>
Application Period	<p>Application for the SUMA programme is a multi-step process. Applicants should register on the SUMA website: www.master-suma.eu For information on the registration/application deadlines for the entry universities, please check the following:</p> <p>KU Leuven www.kuleuven.be/english/application/instructions</p> <p>Montanuniversität Leoben https://starter.unileoben.ac.at/en/3274/</p> <p>University of Trento https://international.unitn.it/incoming/admission</p> <p>University of Milano-Bicocca (UNIMIB) www.unimib.it/unimib-international/bachelor-and-masters/how-enroll</p>
Scholarships	<p>For students beginning in September 2020, EIT Label scholarships from EIT RawMaterials of €13,500 per eligible student are available. For information on how EIT Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: master-suma@kuleuven.be</p>

Participating Universities

KU Leuven
Belgium

Montanuniversität Leoben
Austria

University of Trento
Italy

Grenoble INP
France

University of Milano-Bicocca
Italy

Sustainable Material Solutions with SUMA

The SUMA Master programme aims to train tomorrow's resource engineers in collaborative work in a global world, gathering together some of the best educational programmes in the field of sustainable materials engineering in Europe. The goal is to ensure young scientists obtain a solid background in chemistry and physics, with competences for designing and tailoring new material systems for specific functions, and with a specific view to the sustainability of processes and technologies in the field of material development. SUMA puts a particular strong focus on innovation, entrepreneurship and leadership and takes a holistic approach to the materials paradigm by exploring circular (eco) design, materials substitution, life cycle engineering and circular economy design, materials processing and recycling, manufacturing and innovation.

Programme Structure

The Sustainable Materials (SUMA) Master programmes are two-year programmes embedded in the engineering programmes of the participating universities:

KU Leuven

Master of Materials Engineering

Montanuniversität Leoben

Master in Sustainable Materials

University of Trento

Master in Materials and Production Engineering

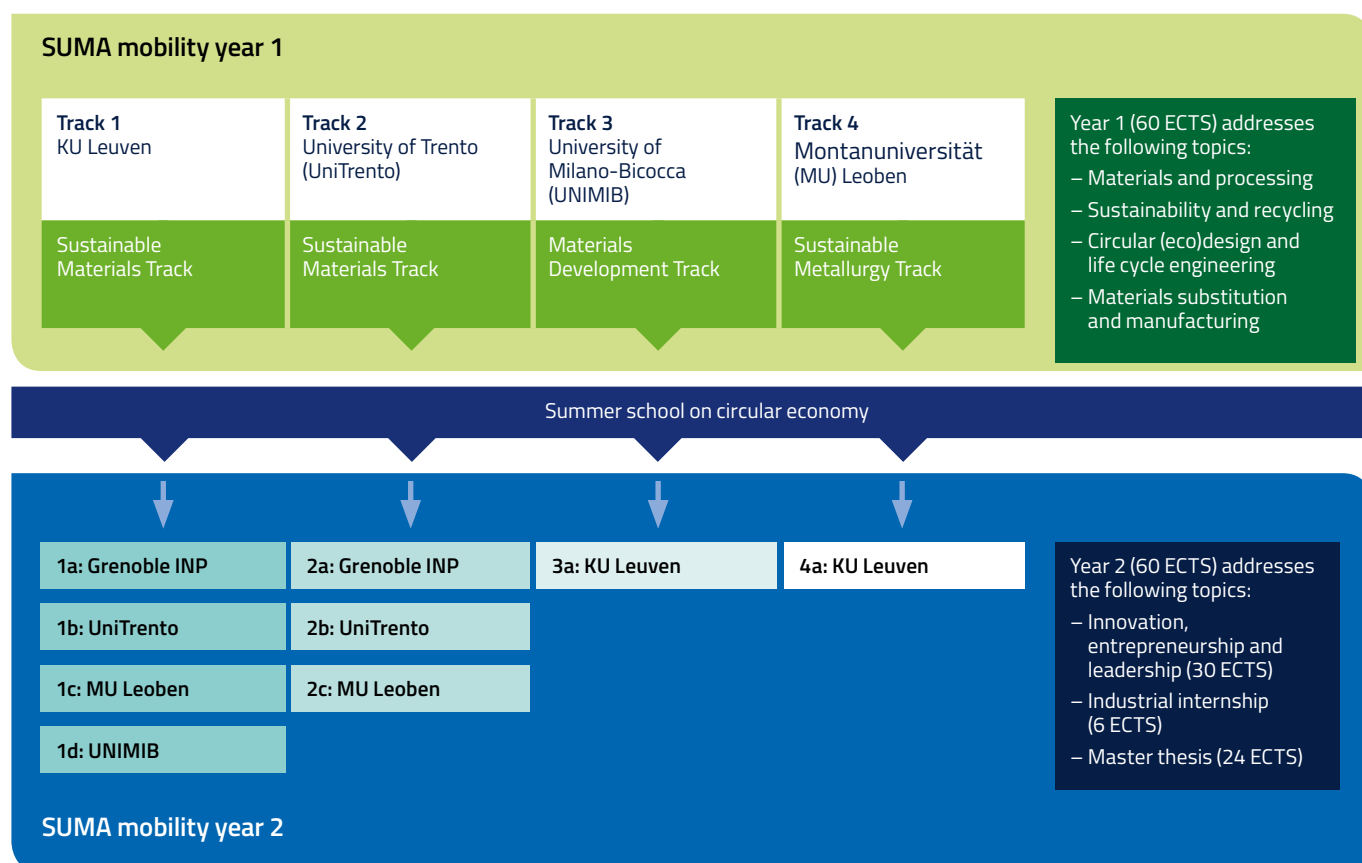
Grenoble INP

Master in Sustainable Industrial Engineering

University of Milano-Bicocca

Master in Materials Science

There are in total 9 tracks, each of which has been awarded the EIT Label. Each track of the SUMA programme consists of one full year at an entry university, followed by a second year at one of the other participating universities.



Innovation and Entrepreneurship Training

As an EIT-Labelled Master programme, SUMA recognises the importance of providing students with the opportunity to explore the economic relevance of sustainable materials solutions and how they are practically implemented in industrial and societal settings. SUMA students will be provided with innovation and entrepreneurship training addressing the following:

- Courses dealing with the implementation of an innovation strategy at a company level and the management of the product development process and strategic management, creativity and decision-making for product development
- Business simulation games
- Testimonies given by young entrepreneurs on the role of engineering in the start-up of technological spin-off companies
- Case studies presented by industrial and company experts in the field
- Small group and individual project work addressing real world problems

One-week Summer School

Every year the SUMA Master programmes organise a summer school where all students from the different tracks come together to learn from leading experts on a particular sustainable materials topic. During the summer school, students will work together in teams on societal and technological challenges, using the knowledge and lecture content from the expert summer school faculty. The 2017 edition took place in Leuven and discussed the topic of 'Digitising the Circular Economy', where students learned how Internet of Things (IoT), big data analysis and Industry 4.0 principles can be applied to sustainable materials processing and recycling. The 2019 SUMA summer school supported the SUMA master students in developing competencies in the field of entrepreneurship. The courses and activities were focused on methods and tools to guide the process of startups creation. Theoretical approaches for new business creation were presented and students were invited to develop and pitch ideas related to startups creation.

"For me the SUMA master programme is one of the most enriching opportunities I've ever taken part in; it combines the tools to a knowledge broadening on the topics I'm passionate about, getting to know lots of people with different backgrounds and attend events and seminars from experts of the sustainability world. It's a life changing experience."

Davide – Italy

Professional Profiles after Graduation

Are you a student who is:

- Interested in earth sciences, mining, materials sciences and engineering?
- Motivated to explore the connection between materials technology and its environmental and socio-economic factors?
- Keen to become entrepreneurial and start your own company?
- Motivated to work closely with industry and research on cutting-edge challenges?

The SUMA Master programme aims at training scientists with a solid background in chemistry and physics, with competences for designing and tailoring new material systems for specific functions, and with a specific view to the sustainability of processes and technologies in the field of material development.

The main job opportunities are in industries and research centres in Europe, working on the development and production of functional materials for advanced applications and high technology.

Graduates can start a career as highly valued future leaders in positions of responsibility in managing advanced material design, production processes and material qualifying protocols in high-tech firms, material diagnostics and analysis in industries and research centres, and material development projects and scientific research projects in the field of material science and technology innovation.

For more information:

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 Belgium

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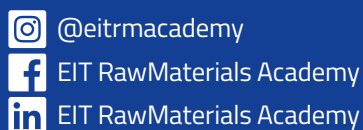


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