

# The EIT-Labelled Master Programmes

Introduction to EIT RawMaterials  
and the EIT Label



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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 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 RawMaterials Labelled programme, you'll be part of the largest European raw materials partnership – with more than 120 core and associate partners and 180 project partners from over 22 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 objective 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 developing circular economy strategies.

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 to develop creative and sustainable solutions to pressing resource and societal challenges.

In short, it's a great opportunity to become a global game-changer, obtain the knowledge, skills and experience employers are seeking out in future graduates, and become part of the RawMaterials Academy Label student community.

# EIT RawMaterials Labelled programmes offer you



Thesis internship placements at leading European companies

The knowledge to become an expert in a particular raw materials discipline, coupled with an overview of the entire raw materials value chain

European mobility – study in at least two European countries

Innovative ‘learning-by-doing’, challenge-based courses which focus on real-life problems

Membership of the EIT Label Alumni Community

Courses designed to nurture start-up ideas at accelerators and incubators

Study tours and site visits to companies and industrial sites

New ways of learning – online courses, virtual and augmented reality and MOOCs

Course modules dedicated to entrepreneurship and innovation skills and competences

EIT RawMaterials Innovation support: business plan competitions, innovation bootcamps, seed funding

EIT RawMaterials summer schools and interdisciplinary courses

## Introduction

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

### Five Master programmes

#### 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

### Two Doctoral programmes

#### IDS-FunMat-INNO

International Doctoral School in Functional Materials

#### NEAT Materials

New Approaches and Technologies in Materials Production

Graduates from all EIT-Labelled programmes are awarded either a dual or joint degree from at least two of the participating universities, with an EIT Label Certificate confirming graduation from an EIT-Labelled programme.





AMIS

# 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 mind-set 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"> <li>– Grenoble INP: Master Science et Génie des Matériaux</li> <li>– Aalto University: Master of Science (Technology)</li> <li>– TU Darmstadt: Master of Science in Materials or Master of Science in Physics or Chemistry</li> <li>– University of Bordeaux: Master Sciences et Technologies, mention CHIMIE, spécialité Synthèse et Propriétés des Matériaux Inorganiques – FAME Hybrids and Ceramics</li> <li>– Master Science Physiques or Master Sciences Chimiques</li> <li>– EIT Label Certificate</li> </ul>
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.
Fees	€1,000/year for EU students €8,000/year for non-EU students
Application Period	1st round: 1 October 2018 – 31 January 2019 2nd round: 1 February 2019 – 31 April 2019
Scholarships	For students beginning in September 2019, EIT-Label scholarships from EIT RawMaterials of up to €9,000 per student are available with additional financial support for student involvement in conferences, summer schools and other events. For information on how EIT-Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: <a href="mailto:contact@amis-master.eu">contact@amis-master.eu</a>

**“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:

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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.
Fees	EU/EFTA students 2018: €2,060/year Non EU/EFTA students 2018: €15,575/year For 2019 entry, fees are subject to an increase of approximately 3%. Please contact the coordinating university directly for more information: <a href="mailto:info@emmep.org">info@emmep.org</a>
Application Period	1 October 2018 – 1 April 2019
Scholarships	For students beginning in September 2019, EIT-Label scholarships from EIT RawMaterials of up to €9,000 per student are available with additional financial support for student involvement in conferences, summer schools and other events. For information on how EIT-Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: <a href="mailto:info@emmep.org">info@emmep.org</a>

“Expanding critical thinking was a big part of the EMC for me. I found developing cooperation with students from a range of international backgrounds to be one of the most fulfilling aspects of the programme.”

Sjoerd – Netherlands

## Participating Universities

**RWTH Aachen University**  
Institute of Mineral Resources  
Engineering  
Germany

**Aalto University**  
School of Engineering and School of  
Chemical Technology  
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
<b>Aalto University</b>	<b>RWTH Aachen University</b>	<b>Delft University of Technology</b>	<b>Thesis</b>
Fundamentals of minerals engineering and recycling (5 ECTS)* <hr/> Technical innovation project (10 ECTS)* <hr/> Economic geology and mineral economics (5 ECTS) <hr/> Rock mechanics (5 ECTS) <hr/> Field experience and project in hard rock mining (5 ECTS) <hr/> *Component of the circular economy design forum	Feasibility studies of mining projects (5 ECTS) <hr/> Reserve modelling and estimation (5 ECTS) <hr/> Mine design and simulation (8 ECTS) <hr/> Mine ventilation (5 ECTS) <hr/> Case study: mining projects (5 ECTS) <hr/> Field/laboratory exercises (2 ECTS)	Data analysis and resource modelling (5 ECTS) <hr/> Computer-aided mine design and optimisation (5 ECTS) <hr/> Legal, health and safety (5 ECTS) <hr/> Financial engineering and investment scenarios (5 ECTS) <hr/> Project execution/mine start-up planning (10 ECTS)	Thesis carried out at one of the universities or at a company with support from EMC and EIT RawMaterials (30 ECTS)

Start two-year programme

Triple degree diplomas received

# 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 mind-set 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.

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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"> <li>– Ingénieur Civil des Mines et Géologue delivered by University of Liège (ULiège)</li> <li>– Master Sciences de la Terre et des Planètes Environnement delivered by University of Lorraine (UL)</li> <li>– Master of Science – Major: Geosciences delivered by Luleå University of Technology (LTU)</li> <li>– Master in Mechanical and Process Engineering delivered by Technische Universität Bergakademie Freiberg (TUBAF)</li> <li>– EIT Label Certificate</li> </ul>
Credits	120 ECTS, 24 months
Language of Instruction	English
Starts in	September
Requirements	<p>Eligible candidates must have a Bachelor's degree in Engineering with basic knowledge in Geology or a Bachelor's 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.</p>
Fees	<p>€4,500/year for EU students          €9,000/year for non-EU students</p>
Application Period	<p>1 October 2018 – 20 January 2019 for Erasmus Mundus scholarships          1 March 2019 – 30 April 2019 for non-EU self-funded students          1 March 2019 – 30 June 2019 for EU self-funded students</p>
Scholarships	<p>For students beginning in September 2019, EIT-Label scholarships from EIT RawMaterials of up to €9,000 per student are available with additional financial support for student involvement in conferences, summer schools and other events. For information on how EIT-Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: <a href="mailto:emerald@uliege.be">emerald@uliege.be</a></p> <p>A number of Erasmus Mundus Joint Master Degree scholarships are available – visit <a href="http://em-georesources.eu">em-georesources.eu</a> for details.</p>

**“Three months before graduating from this programme, I already had several offers for a PhD position... This only goes to demonstrate the well-rounded skills that we obtained from the Emerald programme.”**

Jennifer – Philippines

## Participating Universities

**University of Liège**  
Belgium

**University of Lorraine, ENSG Nancy**  
France

**Luleå Institute of Technology**  
Sweden

**TU Bergakademie Freiberg**  
Germany

## Programme Structure

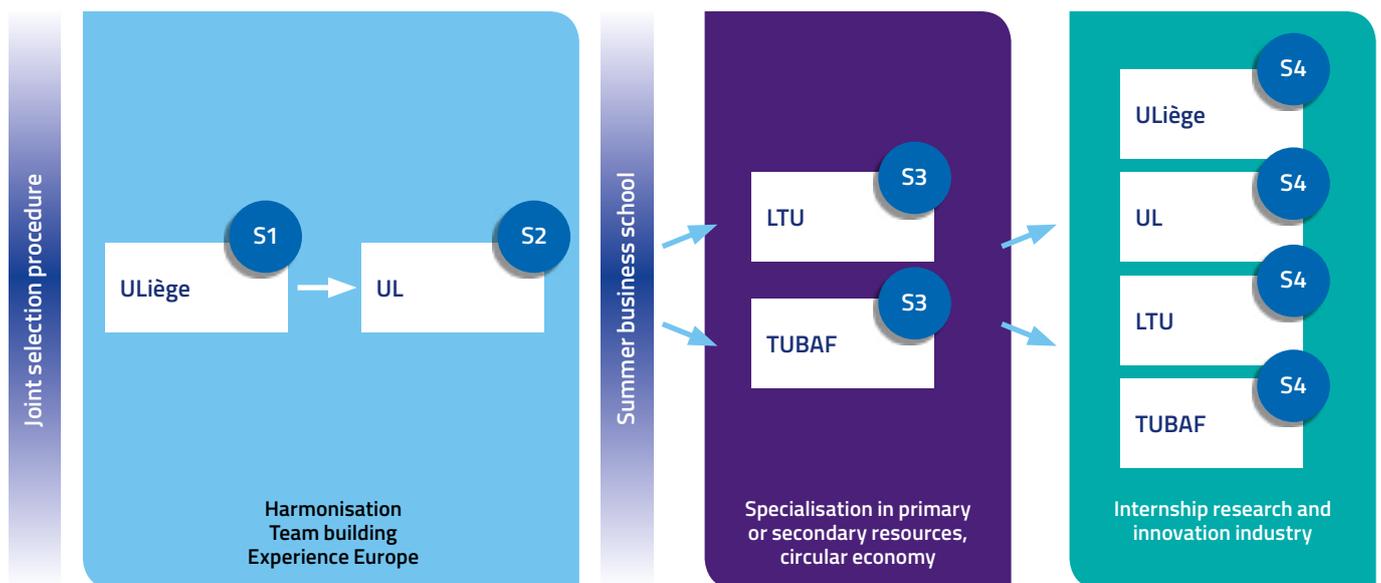
EMerald is organised into four semesters and accounts for 120 ECTS or 30 ECTS per semester.

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 (multidisciplinary). 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](http://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:

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[www.em-georesources.eu](http://www.em-georesources.eu)



SINReM

# 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: <a href="http://sinrem.eu/admission">sinrem.eu/admission</a>
Fees	European (EEA): €6,000/year All others: €12,000/year
Application Period	European (EEA): until 31 May 2019 Non-European: until 28 February 2019
Scholarships	For students beginning in September 2019, EIT-Label scholarships from EIT RawMaterials of up to €9,000 per student are available with additional financial support for student involvement in conferences, summer schools and other events. For information on how EIT-Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: <a href="mailto:sinrem@ugent.be">sinrem@ugent.be</a>  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 – visit <a href="http://em-georesources.eu">em-georesources.eu</a> for details.

## Participating Universities

**Ghent University**  
Belgium

**TU Bergakademie Freiberg**  
Germany

**Uppsala University**  
Sweden

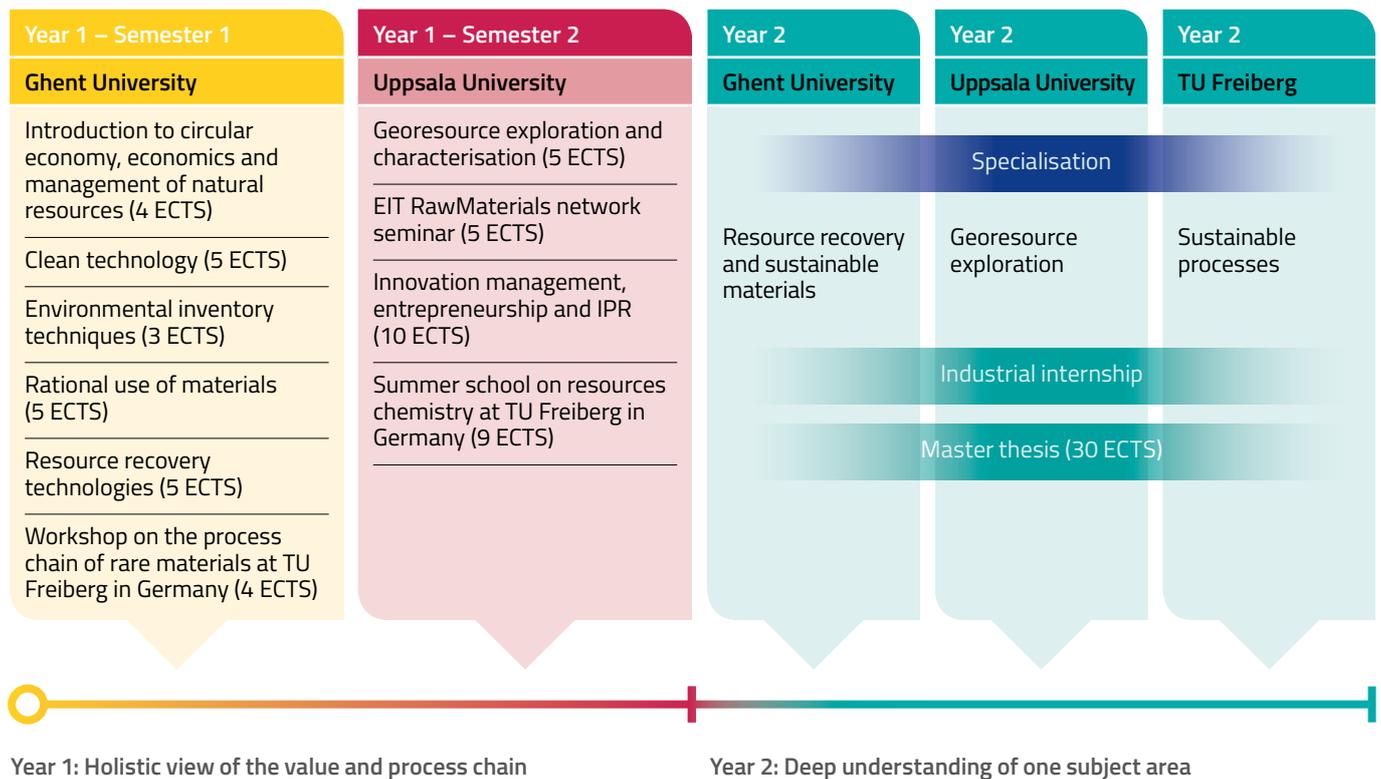
**“My background in geo-ecology made me passionate about the environment... Through SINReM I hope to learn more about economics and the role of different industries and new technologies in finding solutions.”**

Lisa, Germany

## 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.



# 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 mind-set, 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](http://sinrem.eu)

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E: [sinrem@ugent.be](mailto:sinrem@ugent.be)

[www.sinrem.eu](http://www.sinrem.eu)

A woman with blonde hair in a ponytail, wearing a white lab coat, is shown in profile from the waist up. She is holding a white tablet computer with both hands. The background is a blurred industrial or laboratory setting with various pieces of equipment and a red structure. A large blue circular graphic is overlaid on the right side of the image, containing text.

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"> <li>– KU Leuven</li> <li>– Montanuniversität Leoben</li> <li>– University of Trento</li> <li>– Grenoble INP</li> <li>– University of Milano-Bicocca</li> </ul> <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>
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 <a href="http://www.master-suma.eu">www.master-suma.eu</a> for details</p>
Application Period	<p>Application for the SUMA programme is a multi-step process. Applicants should register on the SUMA website: <a href="http://www.master-suma.eu">www.master-suma.eu</a></p> <p>For information on the registration/application deadlines for the entry universities, please check the following:</p> <p><b>KU Leuven</b> <a href="http://www.kuleuven.be/english/application/instructions">www.kuleuven.be/english/application/instructions</a></p> <p><b>Montanuniversität Leoben</b> <a href="http://starter.unileoben.ac.at/en/3489/">starter.unileoben.ac.at/en/3489/</a></p> <p><b>University of Trento</b> <a href="http://offertaformativa.unitn.it/en/Im/materials-and-production-engineering/applying">offertaformativa.unitn.it/en/Im/materials-and-production-engineering/applying</a></p> <p><b>University of Milano-Bicocca (UNIMIB)</b> <a href="http://www.unimib.it/unimib-international/bachelor-and-masters/how-enroll">www.unimib.it/unimib-international/bachelor-and-masters/how-enroll</a></p>
Scholarships	<p>For students beginning in September 2019, EIT-Label scholarships from EIT RawMaterials of up to €9,000 per student are available with additional financial support for student involvement in conferences, summer schools and other events. For information on how EIT-Label scholarships will be awarded and who is eligible, please contact the coordinating university directly: <a href="mailto:master-suma@kuleuven.be">master-suma@kuleuven.be</a></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

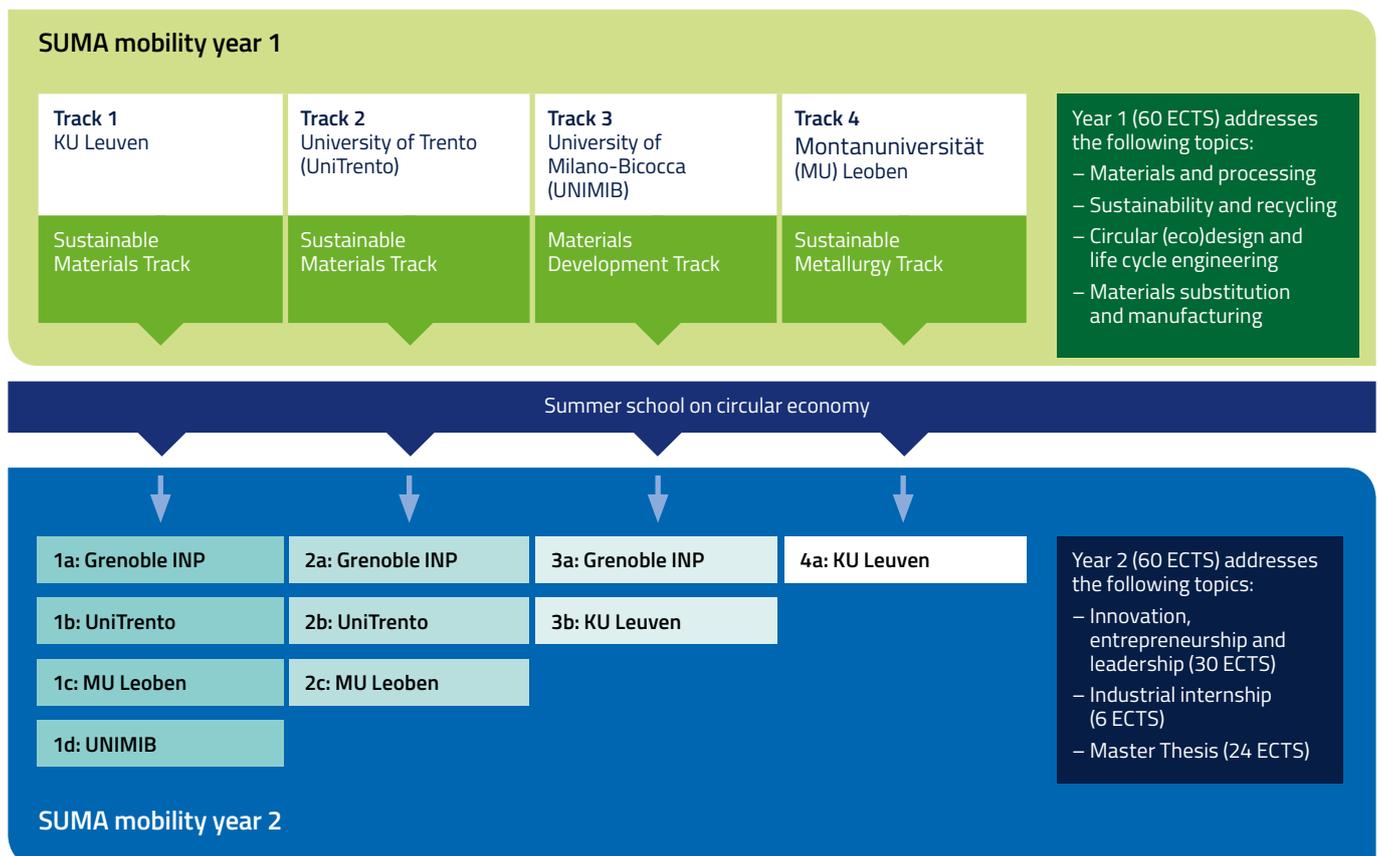
#### Grenoble INP

Master in Sustainable Industrial Engineering

#### University of Milano-Bicocca

Master in Materials Science

There are in total 10 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.



# Master in Sustainable Materials

Awarded the EIT Label in 2016

## 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 2018 SUMA summer school enabled students to master methods of multi-criteria assessment and to develop innovations from lab to business projects and commercialisation.

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**“What I most appreciated about the programme was the chance to do a six-month internship in another country. The fact that the company where I undertook my internship subsequently offered me a position really showed me the value of that.”**

Denis – Belgium

## 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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