


# Master in Advanced Materials: Innovative Recycling

EIT-LABELLED

MASTER'S PROGRAMME



# Introduction



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

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







# What do we offer students?

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

As a student of an EIT-Labelled programme from EIT RawMaterials Academy, you'll be part of the largest European raw materials network with more than 120 core and associate partners and 180 project partners, including higher education professionals, researchers, and industry experts from over 20 European countries. As an EIT Label student, you will be welcomed into this network and will champion and contribute to the EIT RawMaterials goals of finding new, innovative solutions to secure the sustainable supply of raw materials across the value chain: from explo-

ration, mining and extraction, to mineral processing, recycling and the movement towards a circular economy. EIT RawMaterials aims to equip a new generation of innovators in Europe with the necessary entrepreneurial mind-set for designing and delivering materials solutions. You'll also get the chance to collaborate internationally and develop sustainable solutions to pressing economic, environmental and societal challenges. And long after you graduate, you can stay connected via EIT RawMaterials Alumni.



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





# What to expect?

→ Thesis internship placements at leading European companies

→ Membership of the EIT RawMaterials Alumni community

→ 'Learning by doing' with challenge-based courses that focus on real-life problems

→ Study tours and visits to innovative companies and industrial sites

→ Exciting new ways of learning: online courses, virtual and augmented reality and MOOCs

→ Courses designed to nurture start-up ideas with accelerators and incubators

→ Course modules dedicated to entrepreneurship and innovation skills

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

→ Expertise in a raw materials discipline – a comprehensive understanding of the entire raw materials value chain

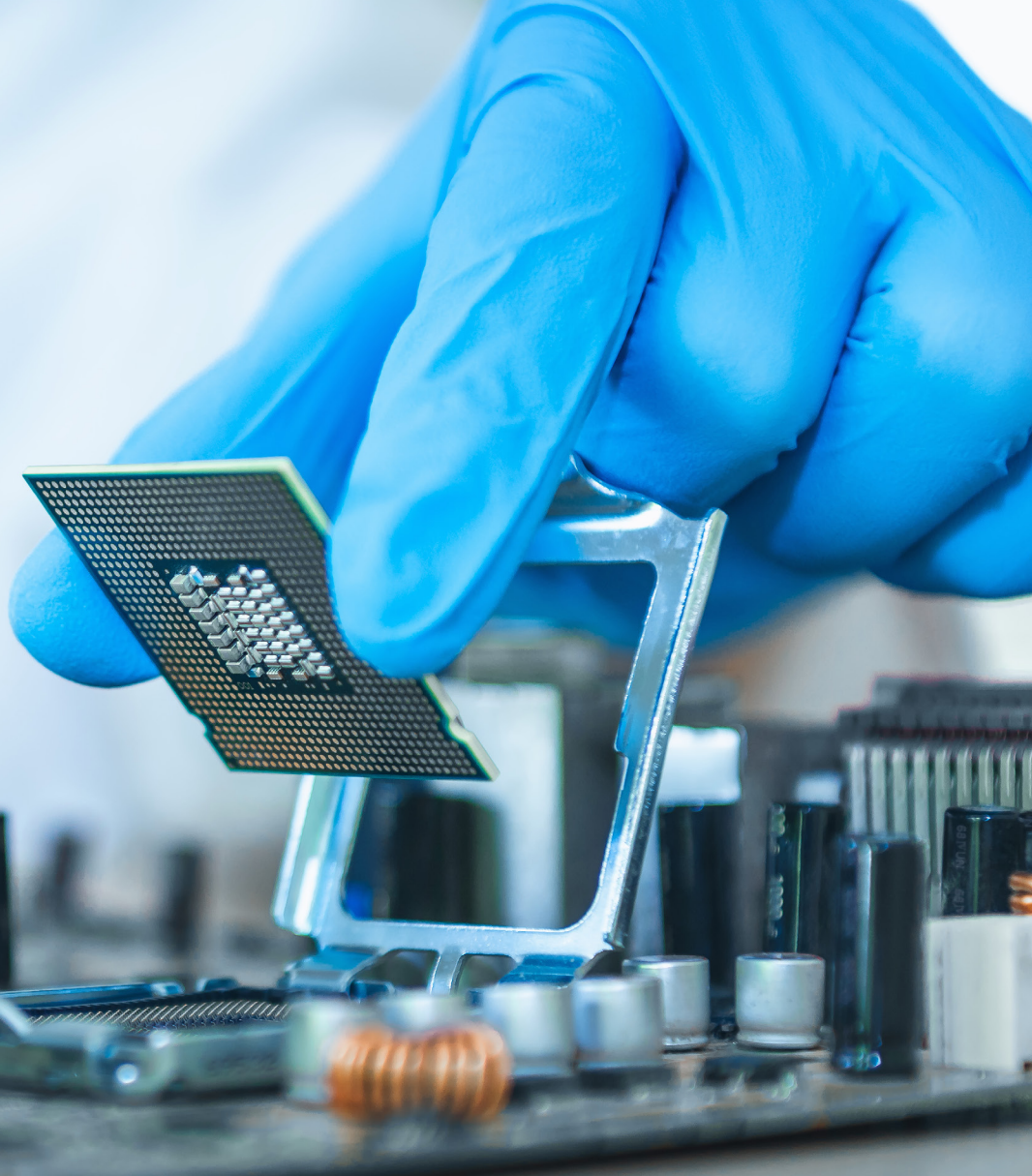
→ EIT RawMaterials summer schools and interdisciplinary courses

→ European mobility – study in at least two European countries





**AMIR master**



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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 that emits less CO<sub>2</sub>. Thirty of these materials have been defined by the EU as critical, meaning that they are both highly important to the EU economy and in dangerously low supply. Accessing the known primary raw material sources has become more challenging, while 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 delivering usable materials to meet increasing demands. To achieve this, we need 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. The AMIR master's programme was created to fulfil this need by educating future international professionals who will develop new routes for materials recycling.



<b>Double Diploma</b>	Graduates of the AMIR programme will be awarded a single or double Master of Science degree, depending upon their chosen pathway. Graduates will also be awarded the EIT Label Certificate.
<b>Credits</b>	120 ECTS, 24 months
<b>Language of Instruction</b>	English
<b>Starts in</b>	September
<b>Requirements</b>	The programme is aimed at candidates who have a bachelor's degree in Engineering and Environmental Sciences with advanced knowledge in Chemistry (minimum 3 years of study or 180 ECTS credits), or a bachelor's degree in Chemistry, Physical-Chemistry, Materials (or Matter) Sciences. Candidates must also demonstrate English language proficiency.
<b>Tuition fees</b>	Please consult the AMIR website ( <a href="http://www.amir-master.com">www.amir-master.com</a> )
<b>Application Period</b>	Check <a href="http://www.amir-master.com">www.amir-master.com</a> for details
<b>Scholarships</b>	For students beginning in September 2021, 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: <a href="mailto:amir.master@u-bordeaux.fr">amir.master@u-bordeaux.fr</a> . Additional scholarships and grants may be available – visit <a href="http://www.amir-master.com">www.amir-master.com</a> for details.



I chose AMIR because I want to help change the unsustainable life-style that causes high environmental impacts, without compromising economic stability. When I finish the master's, 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

##### Technical University of Madrid

Spain

##### University of Miskolc

Hungary

#### FOR MORE INFORMATION

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## INNOVATION AND ENTREPRENEURSHIP TRAINING

As an EIT-Labelled programme, the AMIR master's integrates high-level training on entrepreneurship and innovation into its curriculum, giving students the skills 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-focused 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.

→ 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, Arcelor-Mittal, Veolia and Fraunhofer, ensuring that students gain the top-level experience necessary for success in finding employment or becoming entrepreneurs on completion of their studies.

## 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 contributing to the development of sustainable solutions?
- 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?

## PROFESSIONAL PROFILES AFTER GRADUATION

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.





### **AMIR: MASTER IN ADVANCED MATERIALS: INNOVATIVE RECYCLING**

The AMIR master's 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 recycling professionals. The curriculum of AMIR was designed with the strategic goal of producing T-shaped professionals and entrepreneurs for the raw materials sector with:

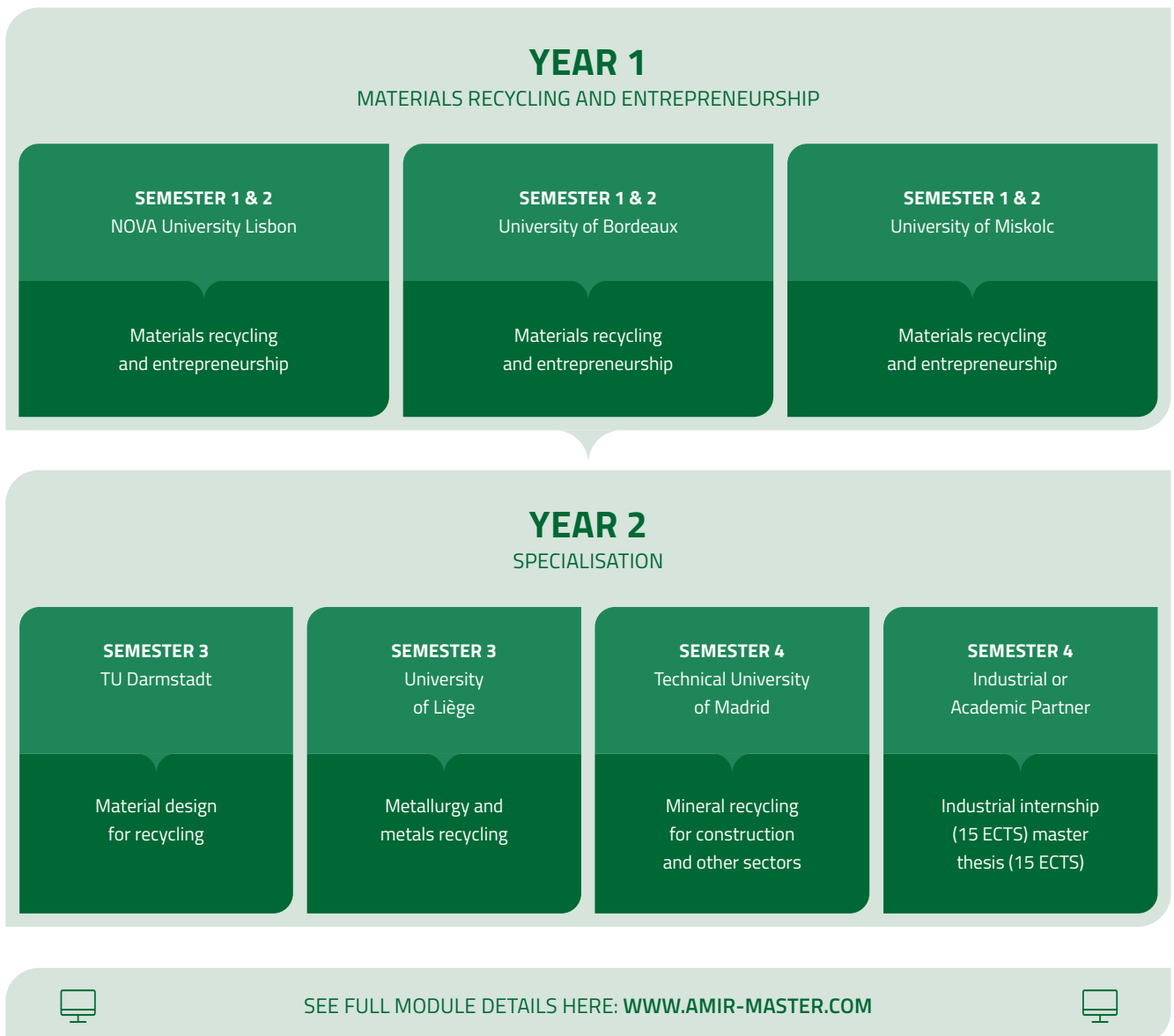
- solid knowledge of the properties and processing of various types of materials (metals, minerals, ceramics, polymers), based on multidisciplinary training by physicists, chemists, process engineers, and others.
- in-depth proficiency in recycling, material chain optimisation for end-of-life products, and design of products and services for the circular economy.
- an entrepreneurial mind-set, formed with the help and expertise of partners from the industry as well as Research and Technology Organisations (RTOs) and associated businesses and incubators.
- essential transferable skills for researchers such as intellectual property, research ethics and scientific communication.



# Programme Structure

**YEAR 1** of the master's programme takes place at the University of Bordeaux, NOVA University Lisbon or the University of Miskolc. 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. In addition, a new module focusing on batteries has been introduced into the programme at Bordeaux, in line with the key trend of electrification in the development of sustainable materials for future mobility.

**YEAR 2** takes place at one of the other 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.









# Exclusive activities and support for EIT-Labelled students

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

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

## SEMESTER 1

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

## SEMESTER 2

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





## SEMESTER 3

### → **The RACE.**

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

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

## SEMESTER 4

### → **Label-Launch!**

Celebrate completing your EIT-Labelled Master's programme during EIT RawMaterials' major event – the RM Summit. Take part in matchmaking events with EIT RawMaterials industry partners and start-ups, and make new connections with raw materials professionals.



# Do you have a raw materials business idea?

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

## Pre-Jumpstarter Workshop

- This exclusive event for students on the EIT RawMaterials Academy Labelled master's programmes offers support to develop your thinking around a start-up idea and, in particular, to prepare you to apply to the EIT Jumpstarter.

## EIT Jumpstarter

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

## Booster call

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

## EIT RawMaterials Accelerator

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



# EIT RawMaterials Alumni

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

It is run by and for its members, who can benefit from events, career development and educational activities and much more, forming a hub for a diverse range of raw materials students, academics and professionals. Furthermore, the EIT RawMaterials Alumni provides you with a connection to the wider EIT Alumni community and alumni events around Europe.





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