

MSc

Zero-Defect Manufacture for a Circular Economy





Global manufacturing innovation will be led by Europe

EIT Manufacturing's mission is to bring European manufacturing actors together in innovation ecosystems that add unique value to European products, processes and services and inspire the creation of globally competitive and sustainable manufacturing.

The European Institute of Innovation and Technology (EIT) is an EU body created in 2008 to strengthen Europe's ability to innovate. Today it is Europe's largest innovation ecosystem with over 2,000 partners.

The EIT supports the development of dynamic, long-term thematic partnerships (Knowledge and Innovation Communities, EIT KICs) among companies, research and higher education institutions, to face specific societal challenges. Together with their leading partners across Europe, the EIT Community offers a wide range of innovation and entrepreneurship activities: Entrepreneurial education courses, business creation and acceleration services and innovation-driven research projects. The EIT Community helps innovators turn their best ideas into cutting-edge products, services and jobs for Europe.

Unique EIT model highlights:

- Provides access to a community that powers innovators through the entire innovation journey, from education to lab to market.
- Embraces disruptive and incremental innovation and embeds entrepreneurial education activities in its innovation activities.
- Business-oriented with strong focus on financial sustainability.
- Delivers a pan-European network strongly anchored in local innovation ecosystems.

EIT Manufacturing is an Innovation Community within the European Institute of Innovation & Technology (EIT) that connects the leading manufacturing actors in Europe. Fueled by a strong interdisciplinary and trusted community, we will add unique value to European products, processes and services – and inspire the creation of globally competitive and sustainable manufacturing.

EIT Manufacturing's approach is designed to immediately and forcefully address specific economic and societal challenges, leveraging opportunities to maximise the impact for successful European manufacturing.

Our vision is that global manufacturing innovation is led by Europe.

Our mission is to bring manufacturing actors of Europe together in innovation ecosystems.



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General information:



Locations:

Ireland, Finland, Italy, France



Duration:

2 years



Application period:

- 1st November – 1st February
(recommended for NOT EU/EFTA applicants that must apply for a VISA to study in Europe)
- 2nd February – 31st March



Language:

English



Study Type:

Campus



Pace:

Full-time



What are the obtained diplomas?

2 Master's Degrees (issued by the entry and exit universities) and an EIT Label Certificate

What is this programme about?

Zero-Defect Manufacture for a Circular Economy combines the study of manufacturing science physics of equipment and processes; data analytics, including the methodology to use gained process data in the context of process quality; and process management, including the flexibility enabled for smaller lot production.

Partner Universities:



Aalto University is where science and art meet technology and business. Founded in 2010 through the merger of three leading Finnish universities, Aalto University is a research university embedded in the community.



Founded in 1863, Politecnico di Milano is one of the most outstanding universities in the world, ranked 20th in the World, 7th in Europe, and 1st in Italy, according to QS World University Ranking by Subject – Engineering & Technology 2020. The University, which trains engineers, architects and industrial designers, has always focused on the quality and innovation of its teaching and research, developing a fruitful relationship with business and the production sector. It hosts the largest school of Engineering, Architecture and Design in Italy, with 2 main campuses located in Milan and 5 campuses based around the Lombardy region, one of the most vibrant and industrialized areas of Europe.



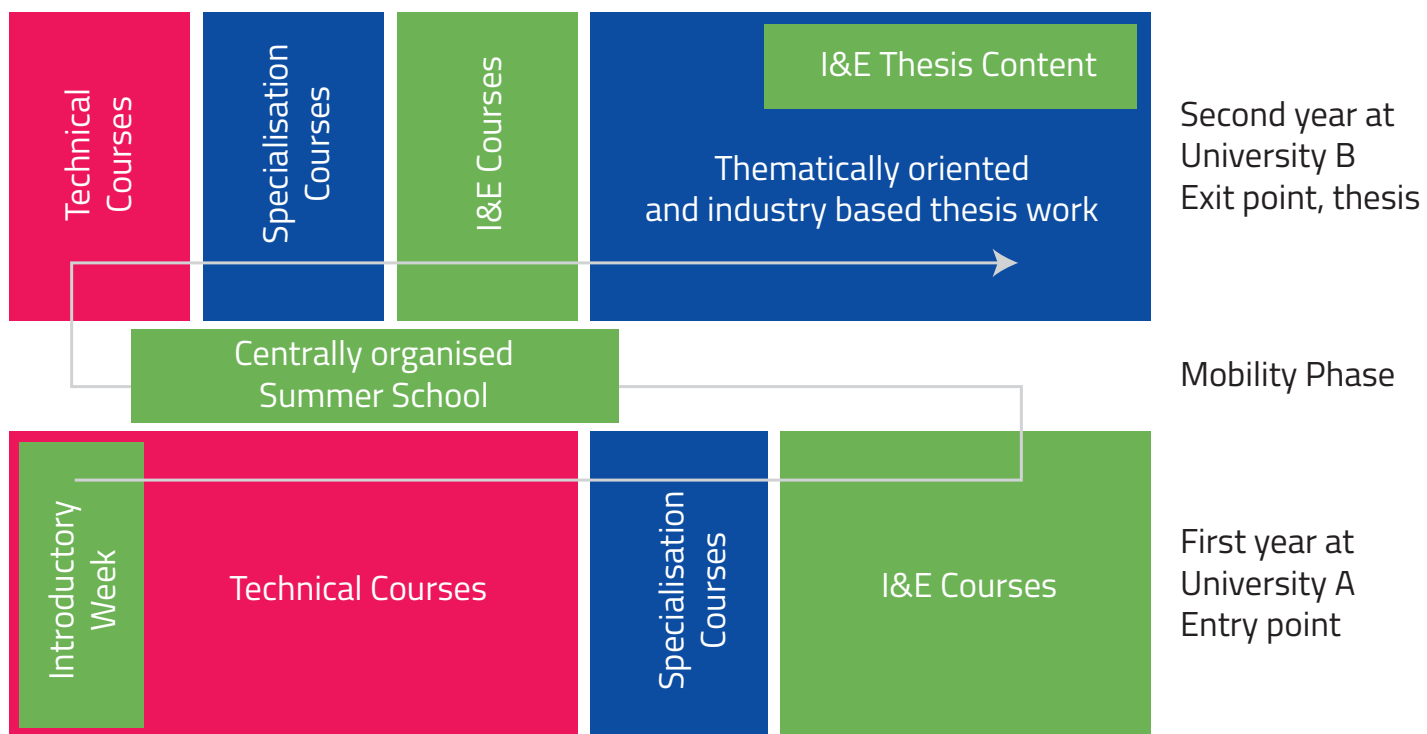
UCD is one of Europe's leading research-intensive universities; an environment where undergraduate education, masters and PhD training, research, innovation and community engagement form a dynamic spectrum of activity. Since its foundation, the University has made a unique contribution to the creation of modern Ireland, based on successful engagement with Irish society on every level and across every sphere of activity. The international standing of UCD has grown in recent years; it is currently ranked within the top 1% of higher education institutions world-wide.



Grenoble INP - Génie industriel, UGA is the Industrial Engineering School of the Grenoble Alps University Institute of Engineering and Management. The school offers a large variety of study opportunities for undergraduates, graduates, foreign students, researchers and engineers. The school has firmly established a reputation for excellence over the past 20 years, both in France and abroad. This is especially due to its unique industrial engineering courses.



Founded in 1962, the University of Trento is a young and dynamic university with 16,000 students and about 1,200 people working as faculty and administrative staff. Quality of research, teaching and internationalisation are the main priorities of the university, along with excellent services, tailored to the needs of the students. Teaching is supported by high-level scientific research in different fields, with areas of distinguished quality at both a national and an international level.



Programme Structure:

Type of modules	Total credits for EIT Manufacturing Master	Total credits 1st year	Total credits 2nd year
Technical courses (TC)	45	40-50	10-20
Specialisation courses (SC)	15		
Innovation & entrepreneurship courses (I&E)	30	10-20	10-20
Master thesis (MT)	30	0	30
Totals	120	60	60





Syllabus:

The courses offered in the Zero-Defect for a Circular Economy programme give a common background at the Entry Universities, while the Exit Universities are generally more specialised on the in zero-defect-specific topics.



1) Technical core courses

Technical common base courses offered by all Entry and Exit Universities in the programme, complemented with the courses of the Add-On Module are as follows, including the individual learning outcome (ILO) of each course:

- **Sustainable Manufacture**

This course teaches students to assess and improve processes to reduce carbon generation and natural resource use.

- **Operations and Logistics**

This course teaches students how to ensure that the right amount of goods are produced and delivered to the correct recipients, according to schedule.

- **Project Management**

This course teaches students how to lead the work of a team to achieve goals and meet success criteria at the specified time.

- **Materials**

This course teaches students the mechanics of materials, including finite element analysis.

- **Additive Manufacturing**

This course provides the student with understanding of the technology, equipment and systems to additively transform materials into parts and assemblies through printing and laser processing.

- **Mechanical Design**

This course covers methods and tools to design parts, components, or products of mechanical nature.

- **Digitalization of Manufacturing Systems**

This course provides the student with an understanding of systems to manufacture products globally in a flexible manner.

- **Robotics and Automation**

This course provides the student with knowledge necessary to design, build and maintain industrial robots and other intelligent automated equipment.

- **Human Machine Interactions**

This course provides the student with understanding of the design and analysis of mechanisms enabling interface between humans and machines.

- **Statistics and Machine Learning**

This course provides the student with understanding of the statistical methods used to design, build and run machine learning solutions, and looks at how to apply them to business and technical problems in the manufacturing context.

- **Additional University Required Courses**

Certain universities have additional degree course requirements, including engineering courses not specifically related to manufacturing. These can include mechanical engineering degree requirements or writing proficiency requirements.



2) Specialisation Courses

Technical specialisations offered by the Entry and Exit Universities in the programme, along with the I&E courses, are:

- **Quality Management**

This course provides the student with knowledge of how to oversee processes to ensure a level of quality and conformance – including by means of metrology.

- **Quality Data Analysis**

This course provides the student with quantitative models and methods for managing, modelling, and monitoring data in industrial and business scenarios, including through use of statistics and machine learning.

- **Manufacturing Processes**

This course teaches students the physics of equipment and processes that transform materials into parts, parts into assemblies, and assemblies into systems, also including their digital models.

- **Process Quality Project**

This course will provide hands on experience developing innovative solutions to industry-based problems.



Admission:

Who can apply to the Master School?

- Students who have a Bachelor of Science Degree worth 180 ECTS in a field related to the track.
- Students in their final year of Bachelor of Science studies may also apply and, if qualified, receive conditional acceptance. They will have to present their degree certificate to the Entry University before enrolment, at the latest.
- The specific required admission diplomas are: B.Sc. degree in Mechanical Engineering, Electrical Engineering, Computer Engineering, Business Engineering, Management Engineering, Computer Science, Information Technology, Industrial Engineering or equivalent.
- Students' Bachelor of Science degree should provide the student with basic competence in the following fields: engineering analysis, production operations, and mathematics - including calculus, algebra, and mathematical statistics (basic competences in Python).

What are the language requirements of the EIT Manufacturing Master School?

All programmes are taught in English. Students are requested to provide an English certificate (IELTS, TOEFL, etc.) to prove their English proficiency*.

Minimum certificate grade is:

- IELTS ≥ 6.5 , with no section lower than 6. A photocopy of the IELTS test result together with your application documents is sufficient.
 - TOEFL ≥ 93 (minimum 21 for writing, 19 in the other sections).
- English test results from TOEFL should be sent directly from the ETS test centre to the EIT Manufacturing Master School Office (EIT Manufacturing Master School code number: C898).
- CAE: grades A – C are accepted.
 - CPE: grades A – C are accepted.

*The TOEFL Test can be waived under certain conditions, please refer to the website for more details.

Finance and Scholarships:

Tuition fees per year*:

€ 8.000	for EU/EFTA candidates
€ 15.000	for non EU/EFTA candidates

**Fees include all programme expenses and insurance but do not cover living expenses and local university text books.*

How are scholarships awarded?

Scholarships may include: mobility grant, subsistence costs support and fee waivers. Scholarships are awarded to a sub-set of students based on a ranking that considers:

- Academic grades
- Gender
- RIS-country citizenship
- Study track

All students are eligible for scholarships and they don't need to present any specific request for it. The EIT Manufacturing Master School will rank the students and offer the scholarships at the time of the student admission.

RIS countries: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain.





A word from EIT Manufacturing:



Paola Fantini

Education Director EIT Manufacturing

"In the EIT Manufacturing Master programmes, students will gain the capabilities, opportunities and support from the network to become real entrepreneurs and change makers, to pursue the career they want to take. They will learn to question the status-quo, identify challenges and opportunities, mobilise energies, develop and promote innovative solutions. They will become skilled at dialoguing, reasoning and negotiating with peers and other stakeholders, in addition to acquiring excellent technical and business competences."



Lucia Ramundo

Master and PhD Programme Manager

"Our programmes allow students to become experts in innovative manufacturing fields from both the technological and business and management side. We develop their leadership, creativity and all soft skills needed to navigate the complex industrial landscape, while also taking into account the needs of society."

The Zero-Defect Manufacture for a Circular Economy programme is a Master of Science level programme within the EIT Manufacturing Master School. The EIT Manufacturing Master School is a highly prestigious Manufacturing Engineering and Science education provider on an advanced level, with a focus on Innovation and Entrepreneurship (I&E). The education at EIT Manufacturing Master School combines technical competence with skills in Innovation and Entrepreneurship. EIT Manufacturing Master School students will be an elite group of forthcoming engineers, operators, innovators and other relevant professionals.

Making innovation happen!

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Keep up with the latest on:

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