



MSc

# Zero-Defect Manufacture for a Circular Economy



Co-funded by the  
European Union

# 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 across Europe:

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 bnetwork 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, 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 a successful European manufacturing.

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

Our mission is to bring manufacturing actors of Europe together in innovation ecosystems that add unique value to European products, processes, services – and inspire creation of globally competitive and sustainable manufacturing.





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# GENERAL INFORMATION

**Locations:** Ireland, Finland

**Duration:** 2 years

**Application deadline:** 1st March 2022

**Language:** English

**Study Type:** Campus

**Pace:** Full-time

## What is this programme about?

Zero Defect Manufacture for a Circular Economy is a combination of studying 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.



## What are the obtained diplomas?

2 Master's Degrees (issued by the entry and exit universities)

An EIT Label Certificate

## Partner Universities

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**POLITECNICO**  
MILANO 1863



Aalto University  
School of Engineering



# PARTNER UNIVERSITIES



**Aalto University  
School of Engineering**

Aalto University is where science and art meet technology and business. By merging three leading Finnish universities in 2010, Aalto was founded to work as a societally embedded research university.

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 productive world. 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.



**POLITECNICO  
MILANO 1863**



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 and Management Engineering School of the Institute. 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.



# SYLLABUS\*

Type of Modules	Total Credits for EIT Manufacturing Master	Total credits Year 1	Total Credits Year 2
Technical courses	45	40-50	10-20
Specialization courses	15		
Innovation & entrepreneurship courses	30	10-20	10-20
Master Thesis	30	0	30
Total	120	60	60

\* The syllabi presented are indications of the classes for the year and may differ

YEAR 1	
AALTO UNIVERSITY	
Semester 1	Semester 2
Compulsory courses	
Machine Design Project (core)	
Quality Management and metrology	
Compulsory courses: at least one of these	
Machine Learning: Supervised Methods	Artificial Intelligence
Reinforcement learning	Multivariate Statistical Analysis
	Non-linear Filtering and Parameter Estimation
Elective Courses: Around 5 of these	
Production Engineering	Welding Technology and Design
Machine Learning: Supervised Methods	Production Systems Modeling
Computer Vision	Advanced Casting Technology
Information Systems in Industry	Advanced Manufacturing
Reinforcement learning	Artificial Intelligence
Distributed and Intelligent Automation Systems	Introduction to Industrial Internet
Model-Based Control Systems	Sensors and Measurement Methods
Venture Ideation	Non-linear Filtering and Parameter Estimation
	Multivariate Statistical Analysis
	Automation Software Synthesis and Analysis
	Autonomous Mobile Robots
	Micro- and Nano Robotics
	Robotic manipulation+F6:G25F9:G25F8F8:F8:G25

YEAR 2	
UCD	
Semester 1	Semester 2
Compulsory courses	
Systems Analysis & Improvement (Core)	Master Thesis
Manufacturing Engineering I (option)	
Manufacturing Engineering II (option)	
Engineering Project Management - Tools & Techniques	
Supply Chain Design & Analysis (core)	
Mechanical Engineering Design II (core)	
Technical Communication (core)	



# ADMISSION



## Who can apply to the Master school?

- Students who have a Bachelor of Science Degree of 180 ECTS in a the field related to the four tracks described above
  - Students in their final year of Bachelor of Science studies may also apply and if qualified, receive a 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:
      - o B.Sc. degree in Mechanical Engineering, Manufacturing Engineering, Computational Engineering, Mechatronics, Industrial Engineering or equivalent degrees.
- Students Bachelor of Science degree should provide the student with basic competence in the following fields:
  - o engineering analysis, production operations, and mathematics including calculus, algebra, and mathematical statistics.
- Students who are fluent in English (English level evaluated by TOEIC, TOEFL ...)

## What are the language requirements of the EITM Master School?

All programmes are thought in English.

Students are requested to provide an English certificate (IELTS, TOEFL, etc.) to prove their English proficiency\*

Minimum certificate grade is:

- IELTS  $\geq 6.5$ , with no section lower than 6

A photocopy of the IELTS test result together with your application documents is sufficient.

- TOEFL  $\geq 93$  (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:

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 countries 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.





# A WORD FROM THE 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, mobilize 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 Program Manager

Our programmes allow students to become experts in innovative manufacturing fields from both 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.

Zero-Defect Manufacture for a Circular Economy programme is a Master of Science level programme within the EIT Manufacturing Master School. The EITM 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.

# EIT MANUFACTURING

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# Making innovation happen!

## About EIT Manufacturing

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Keep up with the latest on:

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