MSc
Data Science and AI for Competitive Manufacturing

MASTER School

Global manufacturing innovation will be led by Europe

EIT Manufacturing's misson is to bring European manufacturing actors together in innovation ecosytems 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:
France, Switzerland, Ireland, Italy

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

Partner Universities:

International development is at the heart of the strategy of Centrale Nantes (ECN), where 42% of the campus population is international. ECN's international policy extends to research and corporate projects: its research laboratories have strong connections with industry and enjoy a world reputation for excellence, especially in Naval Hydrodynamics, Civil Engineering, Composite & Advanced Materials, and Robotics. ECN is currently involved in European projects as a coordinator or partner, and is an active member of international networks of excellence.

The University of Applied Sciences and Arts of Southern Switzerland (SUPSI) is one of the nine professional universities recognised by the Swiss Confederation. Founded under federal law, SUPSI offers more than 30 Bachelor's Degree and Master's Degree courses, characterised by cutting-edge education that unites classical theoretical-scientific instruction with a professional orientation. Great care is given to research, carried out in key sectors through competitively acquired projects with large European and national agencies, or mandated by organisations and institutions.
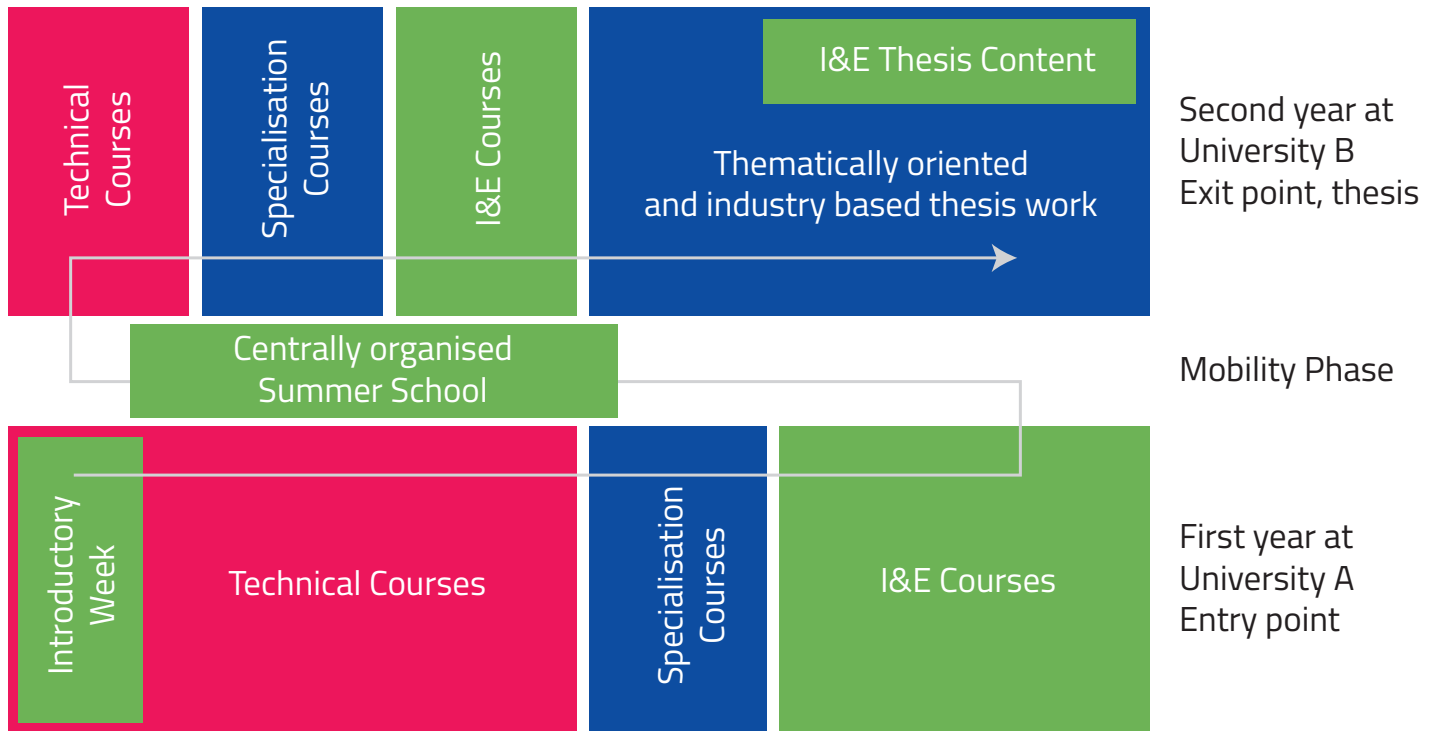
Founded in 1962, the University of Trento is a young and dynamic university with 16,000 students and about 1,200 people working as faculty and administrative staff. Quality of research, teaching and internationalisation are the main priorities of the university, along with excellent services, tailored 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.

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.

Study Path:

| Technical Courses | Specialisation Courses | I&E Courses | I&E Thesis Content

Thematically oriented and industry based thesis work | Second year at University B
Exit point, thesis |

| Centrally organised Summer School | Mobility Phase |

| Introductory Week | Technical Courses | Specialisation Courses | I&E Courses | First year at University A
Entry point |

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 programme give a common background at the Entry universities, while courses in the Exit universities are generally more specialised on the Digital Manufacturing Technologies related 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:

- **6.1.1 Sustainable Manufacture**
This course teaches students to assess and improve processes to reduce carbon generation and natural resource use.
- **6.2.1 Additive Manufacturing**
This first-year 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.
- **6.1.2 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.
- **6.1.3 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.
- **6.1.4 Manufacturing Processes**
This course teaches students the physics of equipment and processes that transform materials into parts into assemblies into systems.
- **6.1.5 Materials**
This course teaches students the mechanics of materials, including finite element analysis.
- **6.1.6 Mechanical Design**
This course covers methods and tools to design parts, components, or products of mechanical nature.
- **6.1.8 Robotics and Automation**
This course provides the student with knowledge necessary to design, build and maintain industrial robots and other intelligent automated equipment.
- **6.1.9 Human Machine Interactions**
This course provides the student with understanding of the design and analysis of mechanisms enabling interface between humans and machines.
- **6.1.10 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.
- **6.1.11 Quality Management**
This course provides the student with knowledge of how to oversee processes to ensure a level of quality and conferment – including by means of metrology.
- **6.1.12 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:

- **Digitalization of Manufacturing Systems**
This course provides the student with understanding of technology-enabled manufacturing that uses the latest developments in Information and Communication Technologies (ICT) to transform, augment and boost traditional manufacturing through new digital technologies and thinking.
- **Design of enterprise information and collaborative information systems**
This course provides the student with understanding of the main methods and tools used in the development projects of an enterprise information system and explains how such development projects are managed.
- **High-performance computing for data science**
This course provides fundamental concepts and tools inherent to High Performance Computing that are applied to design and development of Data Science software for analysis and extraction of knowledge from large volumes of data (Big Data).
- **Service design and Engineering**
This course focuses on the most recent methodologies, languages and tools to support the "service-oriented" approach for planning and managing business processes.
- **Advanced Data Management**
This course covers topics including distributed and parallel database systems architectures; internals and services such as transaction processing, concurrency control and query processing; data processing architecture; and distributed ledger technology and blockchain.
- **Machine Learning in Computer Vision**
This module presents powerful techniques to extract information from images and 3D data, based on machine learning and deep learning methods. The module provides an overview of many image analysis applications.

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:

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.

MASTER School

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 Program 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."

Data Science and AI for competitive manufacturing 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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