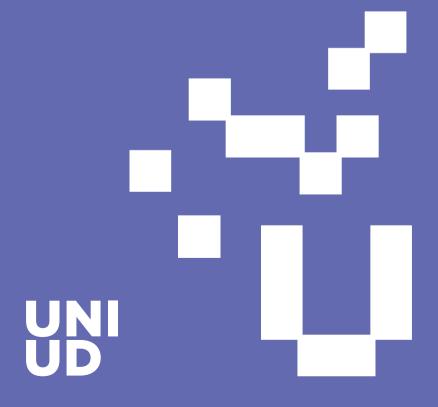
MASTER'S DEGREE
COURSE
INDUSTRIAL
ENGINEERING
FOR SUSTAINABLE
MANUFACTURING
24—25



The MSc (Laurea Magistrale) in Industrial Engineering for Sustainable Manufacturing is rooted in a triple-bottom line view of sustainability, and in a life cycle perspective on goods, services, and supply chains. Students will acquire practical knowledge of the latest technologies for the sustainable production of goods and services, and will become able to engineer safe and innovative products and processes. They will delve into the subjects at the core of digital manufacturing, such as additive manufacturing, robotics, and simulation, and they will get to master analytic approaches and computational tools to assess the environmental impact of industrial and logistic processes, and of manufactured goods over their life cycles. Two curricular options are available:

Track M – Metals, production and materials provides students with a solid understanding of materials science and a practical focus on metals, on their properties and on the production processes of the metal industry.

Track E – Processing, Energy & Environment gives students the skills needed to reengineer and decarbonize industrial processes, by offering courses in renewable energy conversion, hydrogen technologies, carbon capture and utilization.

Active learning approaches, lab-based and project-based learning are a distinctive feature of this program, with a focus on real engineering case-studies.

The strengths of this program are its international character and the close cooperation with environmental consultancy firms, public agencies, energy-intensive and circular manufacturing companies, and generally with companies striving to optimize the sustainability of their processes, which represent the intended workplace for Industrial Engineers for Sustainable Manufacturing.

MASTER'S DEGREE COURSE INDUSTRIAL ENGINEERING FOR SUSTAINABLE MANUFACTURING

ECTS LOCATION DURATION LANGUAGE 2 YFARS **TAUGHT** UDINE. 120 **ENTIRELY** CAMPÚS IN FNGLISH

DEGREE EQUIVALENCE ACCORDING TO ITALIAN LAW

The program qualifies as an "interclass" degree program in LM-31-33 INGEGNERIA GESTIONALE – INGEGNERIA MECCANICA. This means that, when applying for graduation, students are free to choose whether to earn their Master's degree either in Mechanical Engineering – LM 33 INGEGNERIA MECCANICA or in Management Engineering - LM 31 INGEGNERIA GESTIONALE.

PROGRAM ENROLMENT

"RI77I"

To enrol in this Master's program, you must hold a relevant bachelor's degree with major in engineering from either an Italian or a foreign university.

If the degree is awarded by an Italian university, a bachelor's degree (Laurea Triennale) in class L-9 (Industrial engineering) is required. You will also be required to demonstrate proficiency in English at an upper-intermediate level (level B2 in the Common European Framework of Reference). This will be assessed by the Advisor Committee of the program, who will evaluate whether you meet the admission criteria by examining your application, the attached documents and certifications of your academic and linguistic background, and by arranging an interview if needed. Enrolment of students who are not EU-citizens and/or who hold a BSc from a foreign university is subject to specific regulation.

Find more information here: https://www.uniud.it/en/uniudinternational/International_Students/enrolment-recognition-offoreign-titles-and-diplomas and write to studenti@uniud.it to get info and support for your specific case.

CURRICULUM OVERVIEW

FIRST YEAR

Systems (ING-IND/17)

COURSES AND ACTIVITIES ECTS Sustainable Manufacturing (ING-IND/16) 6 integrated with Smart Manufacturing 6 and Process Digitalization (ING-IND/16) **Fundamentals of Control Systems** 6 and Optimal Control (ING-INF/04) Project Management (ING-IND/35) 6 6 Circular Economy (ING-IND/35) integrated with Sustainable Supply Chain 6 Management (ING-IND/35) Mechatronic Systems 6 (ING-IND/13) integrated with Robotics (ING-IND/13) 6 Cleaner Production 6

ELECTIVE TRACK COURSES

TRACK M METAL PRODUCTIONS AND MATERIALS (6 CFU)

COURSES	ECTS
Materials for Sustainable	6
Industrial Manufacturing Processes (ING-IND/22)	

TRACK E PROCESSING AND ENVIRONMENT/ ENERGY (6 CFU)

COURSES	EC12
Industrial eco-efficiency	
(ING-IND/17)	6

SECOND YEAR **COURSES AND ACTIVITIES**

ECTS

15

ECTE

Green Machine	6
Design (ING-IND/14)	
integrated with	
Digital Modelling for	6
Structural Analysis	
and Design (ING-IND/14)	
Elective activities (*)	12
Seminars and workshops	3
held by expert from companies	

ELECTIVE TRACK COURSES

Preparation and discussion

of the Master's thesis

COLIDEES

(ING-IND/16)

TRACK M **METAL PRODUCTIONS** AND MATERIALS (18 CFU)

COURSES	ECIS
Fundamentals of Metallurgy (ING-IND/21)	6
integrated with Environmentally Friendly Plants for Steelmaking and Metallurgy (ING-IND/21)	6
Advanced Technologies	<u></u> 6

for Green Manufacturing

students for: equivalent to 12 ECTS)

TRACK E PROCESSING AND **ENVIRONMENT/ ENERGY (18 CFU)**

COURSES E	CTS
Decarbonization of Processing	6
Industry (ING-IND/27)	
integrated with	
Hydrogen Technologies (ING-IND/27)	6
Sustainable Energy Conversion	
Systems (ING-IND/09)	6

(*) Elective activities

Credits for elective activities may be assigned to

- · Curricular (i.e. not thesis related) internships in companies (150 h equivalent to 6 ECTS or 300 h
- · Internal internships at labs or programs internal to the university (up to 150 h equivalent to 6 ECTS)
- · Exams taken abroad in Erasmus programs which do not have an immediate equivalent in the study plan Additional elective courses.
- · Additional elective courses can be chosen from any of the scheduled courses offered by the University of Udine at the graduate level. They are generally subject to approval by the Teaching commission of the program. Following courses offered at the Polytechnic Department of Engineering and Architecture are especially recommended:

COURSES	ECTS
Applied Statistics (SECS-S/01)	6
Data analytics & machine learning (ING-INF/05)	6
Exergy analysis (ING-IND/10)	6
Industrial Buildings' Sustainability (ICAR/10)	6



UNIVERSITÀ DEGLI STUDI

HIC SUNT FUTURA



DPIA

DIPARTIMENTO
POLITECNICO DI INGEGNERIA
E ARCHITETTURA
UNIVERSITÀ DEGLI
STUDI DI UDINE

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Polytechnic Department of Engineering and Architecture via delle Scienze 206, Udine t 0432 558256/8694 didattica.dpia@uniud.it

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