UNIVERSITÀ
DEGLI STUDI
DI MILANO

Master's degree programme in

Sustainable industrial chemistry

facoltà di

SCIENZE E TECNOLOGIE

Objectives

The Master's Degree program in Sustainable Industrial Chemistry, entirely taught in English, is designed to train high-quality human capital, capable to take on the challenges of the global economy, favouring access of graduates in Industrial Chemistry to the world labour market. The key role given to English in this learning program is justified by the fact that English has long since represented a global communication tool in economy and society, which will contribute to the achievement of the prefixed quality objectives.

The Master's Degree Course in Sustainable Industrial Chemistry aims at preparing chemists with a good knowledge of theory and practical aspects of the industrial production in different areas of chemistry, specifically concerning the product-process relationship, as well as of economics and management. The students could also learn to work independently and to take full responsibility of projects and structures.

The Master's Degree program in Sustainable Industrial Chemistry complies with the European standards of reference for Sciences and Technologies of Industrial Chemistry and provides technical skills in the disciplines of chemistry and industrial chemistry and in their applications.

Career prospects

Graduates in Sustainable Industrial Chemistry will be able to carry out, among others, the following activities: promotion and development of the scientific and technological innovation; planning and management of industrial technologies; holding functions of high responsibility in the industrial, environmental, health care, and public service sectors.

Graduates in Sustainable Industrial Chemistry are expected to find employment in research and development in chemical industries; design and management of pilot and chemical plants; industries and research centers working in diversified sectors of either conventional or innovative fields.

The acquired competences allow graduates to have open access to several industrial sectors such as those of polymeric materials, food industry, agrochemicals, additives, auxiliaries, materials for electronics, ecology, intellectual property (patents) and business management.

For the graduate of this class, enrolment in the National Federation of the Order of Chemists and Physicists is possible, after passing the State Exam.

Applications and admissions

Open, subject to entry requirements through an interview.

Admission requirements

The curricular prerequisites to be admitted to the selection procedures at the Master Degree course in Industrial Chemistry are those peculiar of the L-27 class of Italian bachelor's degree courses, and in particular:

- at least 20 ects in disciplines of mathematics, information technology and physics;
- at least 70 ects in discipline groups belonging to the distinguishing areas included in the L-27 class table:
  - analytical and environmental chemistry (CHIM/01 and CHIM/12);
  - inorganic and physical chemistry (CHIM/03 and CHIM/02);
  - industrial chemistry and industrial engineering and technology (CHIM/04, CHIM/05 and ING-IND/21-22, ING-IND/25);
  - organic chemistry and biochemistry (CHIM/06, BIO/10-12).

All other students must demonstrate to have the curricular requirements of the graduates of the class L-27. Different curricular profiles will be evaluated by the Commission for the Access to Industrial Chemistry.

The personal skills of each candidate will be ascertained through an interview on topics related to the subjects covered in the fundamental courses of the bachelor's degree in Industrial Chemistry with a special examining commission appointed by the Teaching Council.

The minimum entry requirement in English proficiency is level B2 ("intermediate") of the Common European Framework. This requirement will be examined before admission by the SLAM Office.

Language Test

Students not holding an Italian high school diploma or university degree can obtain 3 credits in Additional language skills: Italian at an A2 level or above, in replacement of the 3 credits in Chemical regulation and legislation.

Degree syllabus

I year

LEARNING ACTIVITIES	ECTS
Advanced industrial chemistry with lab	9
Chemical processes and industrial plants	6
Economics and management	6
The student must earn 9 ects by selecting one from the following items: - Advanced functional materials for industrial applications with lab - Applied organic chemistry with lab - Chemical technologies for the energy transition with lab	9

Table 1

Student must earn 9 credits by selecting 1 of the following courses

LEARNING ACTIVITIES	SSD	ECTS
II semester		
Advanced functional materials for industrial applications with lab	CHIM/04	9
Applied organic chemistry with lab	CHIM/06	9
Chemical technologies for the energy transition with lab	CHIM/06	9

Table 2

Student must earn 6 credits by selecting 1 of the following courses

LEARNING ACTIVITIES	SSD	ECTS
I semester		
Advanced methods in organic synthesis	CHIM/06	6
Catalytic methodologies in organic synthesis	CHIM/06	6
Concepts and methods in organic synthesis	CHIM/06	6
Environmental electrochemistry	CHIM/02	6
Formulation science and technology	CHIM/02	6
Nanotechnology for advanced materials	CHIM/03	6
Technology-driven organic synthesis	CHIM/06	6

LEARNING ACTIVITIES	SSD	ECTS
II semester		
Analytics for chemical industry	CHIM/01	6
Environmental control and sustainability management	CHIM/12	6
Heterogeneous catalysis	CHIM/02	6
Machine learning for chemicals sciences and industry	CHIM/02	6
Metal science and corrosion	CHIM/02	6
Polymorphism and crystal forms in industry *(not activated a.a. 2025/2026)*	CHIM/03	6
Recovery and recycling of critical materials and chemicals for waste management	CHIM/03	6
Sustainable synthetic methodologies in homogeneous catalysis	CHIM/03	6
Synthetic methods in biotechnology	CHIM/06	6

Table 3

Student must earn 12 credits by selecting 2 ofrom Table 2 or Table 3

LEARNING ACTIVITIES	SSD	ECTS
I semester		
Plastic degradation and its environmental impact	CHIM/04	6
Polymer testing and analysis	CHIM/04	6
Recycle and life cycle assessment (LCA) of products and processes	CHIM/04	6
II semester		
Process development	CHIM/04	6

Table 4

Student must earn 6 credits by selecting 1 course

LEARNING ACTIVITIES	SSD	ECTS
I semester		
Design and optimization of chemical plants	ING-IND/25	6
Fermentation biotechnology	CHIM/11	6
Patents and management of innovation	SECS-P/07	6
II semester		
Chemistry digitalization for industry 4.0	ING-IND/25	6
Medical chemistry	CHIM/08	6

Table 5

Student must earn 12 credits by selecting 2 related and integrative courses

LEARNING ACTIVITIES	SSD	ECTS
I semester		
Energy economics	SECS-P/01	6
Programming for chemistry	INF/01	6
II semester		
(Bio)nanotechnology	FIS/03	6
Language programming	INF/01	6
Chemical safety	IUS/07	6
Chemometrics	SECS-P/01	6
Information Technology	INF/01	6
Protein biochemistry	BIO/10	6
Protein engineering and molecular enzymology	BIO/10	6
Technological properties of minerals, cements and ceramics	GEO/6, GEO/9	6

II year
(to be made available as of academic year 2026/2027)

COURSES	ECTS
Free-choice elective courses (the student must earn 12 ects by choosing freely between all the teachings activated, offered by the University, provided they are coherent with the educational project)	12
Experimental research stage	15
Thesis work and Final dissertation	24

INFO

Disciplinary classification: Industrial chemistry (LM-71 R)

Duration: 2 years (120 ects)

Attendance: it is mandatory to attend the Laboratory courses/modules.
In all the other cases the attendance is strongly suggested.

Location:
- Department of Chemistry - via Golgi, 19 - Milano

Websites:
sic.cdl.unimi.it/en
www.unimi.it

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Updated in May 2025.
For further information: www.unimi.it - Education