UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2025/26
BACHELOR
Industrial Chemistry (Class L-27)
Students enrolled from the academic year 2009-2010 to 2023-2024

HEADING	
Degree classification - Denomination and code:	L-27 Chemistry
Degree title:	Dottore
Length of course:	3 years
Total number of credits required to complete programme:	180
Years of course currently available:	3rd
Access procedures:	
Course code:	F6X

PERSONS/ROLES

Head of Study Programme
Prof. Luigi Falciola

Degree Course website
https://chimicaindustriale.cdl.unimi.it/it

Administrative students office

Via Celoria, 18 - 20133 MILANO Phone 0250325032 https://www.unimi.it/it/node/360 https://www.unimi.it/it/node/359/ https://informastudenti.unimi.it/saw/ess?AUTH=SAML

Department of Chemistry

Via Golgi, 19 - 20133 MILANO http://www.chimica.unimi.it

Didactic Office of the Department of Chemistry

Sig. Antonino Nucera - Via Golgi, 19 - 20133 MILANO Phone 02 50314419 dal lunedì al venerdì dalle ore 10 alle ore 12, in altri orari previo appuntamento https://fb.me/chimicamilano per contattare: https://informastudenti.unimi.it/saw/ess?AUTH=SAML

DSA and disability tutor

Mariangela Longhi Phone 02503 14226 https://www.unimi.it/it/ugov/person/mariangela-longhi Email: mariangela.longhi@unimi.it

Entrance guidance tutor

Francesca Tessore Phone 02503 14398 https://www.unimi.it/it/ugov/person/francesca-tessore Email: francesca.tessore@unimi.it

Erasmus and international mobility tutor

Emma Gallo Phone 02503 14374 https://www.unimi.it/it/ugov/person/emma-gallo Email: emma.gallo@unimi.it

Internship tutor

Paola Fermo Phone 02503 14246 https://www.unimi.it/it/ugov/person/paola-fermo Email: paola.fermo@unimi.it

Referent of the Quality Management System (QA) of The Bachelor's degree

Dominique Roberto Phone 02503 14399 https://www.unimi.it/it/ugov/person/dominique-roberto Email: dominique.roberto@unimi.it

Study plan, transfer and credit recognition tutor

Pierluigi Mercandelli Phone 02503 14447 https://www.unimi.it/it/ugov/person/pierluigi-mercandelli Email: pierluigi.mercandelli@unimi.it

Tutor for teaching support

Alberto Vertova (Tel. 02503 14232) e Vittoria Guglielmi (Tel. 02 50314426)
https://chimica.unimi.it/it/dipartimento/organizzazione/commissioni-didattiche/tutoring Email: tutoring.chimica@unimi.it

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

It is the specific objective of the degree course in Industrial Chemistry to enable the student both to continue with higher studies, and to immediately enter a professional activity.
The course allows you to acquire an adequate basic knowledge, not only theoretical but also experimental and applicative, in the main sectors of chemistry and to provide an adequate preparation in the mathematical and physical disciplines.
In addition, it aims to achieve the following educational objectives:
- acquisition of an adequate knowledge of the tools for the deepening of application issues, such as the product-process connection;
- acquisition of the knowledge necessary to evaluate the different theoretical and practical aspects of the production of chemical products from the laboratory to the industrial scale, respecting the environment;
- acquisition of a good knowledge of experimental methods in the chemical and industrial fields;
- acquisition of appropriate tools to frame the knowledge of chemistry and industrial chemistry in relations with other scientific and technical disciplines;
- development of in-depth basic knowledge Moderna chemical-industrial, useful for the insertion in work activities that require the ability to apply modern scientific methods and techniques.
The acquired skills allow the graduate to carry out appropriate activities in specific professional fields, to interact with culturally contiguous professionals and to continue their studies in the Master's Degree courses.

Expected learning outcomes

- Knowledge of chemical science and technology in the fields of chemistry and industrial chemistry.
- Ability to collect, analyze and process data obtained in the laboratory, with particular reference to: stoichiometric calculations, energy balance calculations and sizing of chemical equipment, determinations of equilibrium constants, kinetic constants and reaction orders.
Ability to carry out experimental procedures and compile reports in this regard with reference to: synthesis and characterization of compounds, chemical-physical techniques and methodologies (calorimetry, electrochemistry), recognition of the molecular and structural properties of products and materials, safe use and disposal of chemical substances.
- Acquisition of conscious autonomy of judgment with reference to: evaluation and interpretation of experimental laboratory data, design, programming and conduct of experiments, formulation and proposed solution of analytical problems, placement of specific chemical knowledge in their relationships with other disciplines, retrieval and screening of sources of chemical information, data, and literature.

Graduates of the Industrial Chemistry course must be able to communicate the results of their analyzes and evaluations in a clear and effective way, using the most widespread language in the international working contexts of reference (English) and masterfully making use of modern IT tools for analysis and presentation of data. They must also be able to work in groups and operate with defined degrees of autonomy.

The expected learning outcomes are: the acquisition of adequate skills for the development and updating of skills regarding bibliographic research, databases and other online information, the acquisition of autonomy that allows one to consult books of advanced texts and specialized journals in the research sectors of chemistry and scientific disciplines, and the ability to quickly enter the world of work.

Professional profile and employment opportunities

INDUSTRIAL CHEMIST
- Function in a work context -
The industrial chemist designs and develops new products and materials, mainly in the industrial sector, and defines their production and control criteria. He can take care of quality control and environmental control, wastewater treatment and disposal processes. It defines the strategies and procedures for the synthesis, transformation and purification of chemical compounds, the techniques for chemical and physical analyses, the scientific method of investigation and data management.
- Skills associated with the function -
The Industrial Chemist must possess a good knowledge of chemistry, industrial chemistry and chemical plant engineering and of the problems connected to the development of chemical products. He must have competence in chemical analysis methods and aptitude for the use of current information technologies, as well as knowing English. The industrial chemist can carry out technical and legal assessments relating to damage to plants or ecological damage in cases of litigation.
- Employment opportunities -
The industrial chemist can find employment in the basic chemical industry, fine chemicals and in research and development laboratories. Other employment opportunities are in public and private research institutions, analysis, quality control and certification laboratories and industries and work environments that require basic knowledge in the sectors of chemistry and industrial chemistry. In the public sector, industrial chemists can work in the technical offices of local authorities, in provincial hygiene and prophylaxis laboratories and/or in workplace accident prevention services. The freelance profession is generally carried out as a consultant for design, plant management, authorization practices in the environmental field and risk analysis as well as with assignments in the courts.

PRODUCT, PROCESS AND FORMULATION RESEARCH AND DEVELOPMENT OFFICER
- Function in a work context -
The industrial chemist may have the task of synthesizing new industrial products for various uses and following their creation in companies, providing for the testing and control of chemical production plants, as well as purification and

depollution plants, guaranteeing their safety. As part of a pre-established programme, it carries out laboratory tests for the development of new processes and formulations and the improvement of existing ones, and also verifies that products, processes and formulations comply with current regulations and safety standards.
- Skills associated with the function -
The industrial chemist must possess, in addition to a good knowledge of chemistry and industrial chemistry and plant engineering, also the rigor necessary to promptly apply the scientific method and a fundamental knowledge of the problems related to the scale-up of products, as well as of the regulations concerning safety and related legislation.
- Employment opportunities -
This professional figure can find employment in private chemical and petrochemical, cosmetic, food, plastics, dyes, detergents, glues or companies operating in the environmental field.

MANAGEMENT AND OPERATION OF PRODUCTION PLANTS
- Function in a work context -
The industrial chemist follows the operation of the plants in compliance with safety and the environment, according to the production plan and according to market needs and takes care of everything necessary for their safety. He collaborates in the study of solutions for the continuous improvement of the reliability and energy efficiency of systems. Furthermore, it guarantees supplies to customers in terms of quality, compliance with specifications and safety.
- Skills associated with the function -
The industrial chemist must possess, in addition to a good knowledge of industrial chemistry, also that of plant engineering. This profession requires a fundamental knowledge of the problems related to the scale-up of products, as well as of the regulations regarding safety and the relevant legislation; they must also have an aptitude for the use of current information technologies and know English.
- Employment opportunities -
The industrial chemist can find employment in the field of research and development, production and logistics in chemical, petrochemical, metalworking, plastics, dyes, detergents and adhesives companies. Possible employment opportunities are in public and private research institutions, quality control laboratories and industries and work environments that require basic knowledge in the sectors of chemistry and industrial chemistry.

SCIENTIFIC INFORMANT AND COMMUNICATER
- Function in a work context -
This graduate increases scientific knowledge in the subject, uses and transfers this knowledge in industry, medicine, pharmacology and other production sectors. He introduces operators in the industrial field to the characteristics and properties of his company's products. The function of the scientific informant and communicator is to propose the adoption of specific products, develop scientific information activities at interested companies to ensure their correct use.
- Skills associated with the function -
The skills necessary for the Scientific Representative in carrying out his work consist not only of scientific knowledge, but also of commercial skills. In particular, he must have good basic knowledge in chemistry, knowledge of pharmaceutical, cosmetic and food products and their correct use. Knowledge of technical English and IT, possession of a driving license, willingness to travel, ability to communicate and resourcefulness complete this professional profile.
- Employment opportunities -
The scientific representative works for cosmetic, pharmaceutical, food, plastic, dye, detergent, glue or environmental companies, in general for all companies in the chemical sector and/or for specialist magazines.

The graduate of this class is expected to enroll in the Register of the National Federation of Orders of Chemists and Physicists as a Junior Chemist, after passing the State Exam.

Initial knowledge required

Requirements and knowledge required for access
As from the academic year 2024-2025 the Degree course in Industrial Chemistry - to keep up with the new trends that are emerging in professional fields - is revisited in some basic and characterizing courses, this edition of the Manifesto is reserved for students enrolled until the 2023-2024 academic year. Therefore, for the methods of access to the updated Degree Course in Industrial Chemistry, it is necessary to consult the Study Manifesto valid for students who will enroll starting from the 2024-2025 academic year, available on the degree course website.

However, students already enrolled in a degree course at the University of Milan, at another university or already graduated, can be exempted from the initial preparation assessment test if they have at least 30 credits attributable to 1st year exams. course, of which 9 can be validated for the Mathematics Institutions exam. To this end, a specific request for prior career evaluation must be submitted by accessing the online service indicated in the admission notice. Interested parties must declare all the exams taken with the relevant sectors, credits and grades and attach the course programmes. For further details on the procedure, please refer to the announcement.
The case will be examined by the CD Transfer Commission. In the event that the applicant is not eligible for years subsequent to the first, he or she will have to take the test.
Requests for evaluation, accompanied by the programs of the exams taken, must be submitted without exception by the date that will be published in the notice and the outcome of the evaluation will be communicated via e-mail.
Students admitted to years subsequent to the first will be able to enroll within the deadlines and with the methods specified

in the announcement.
Students admitted to the first year will have to take the test and submit the admission application, as indicated in the announcement.
Similarly, to speed up the paperwork process, all requests for equivalence of exams taken and/or recognition of previous careers must be accompanied by the programs of the exams taken.

Compulsory attendance

Attendance is mandatory for laboratory activities, and strongly recommended in all other cases.

Internship criteria

At the end of the course of study, a compulsory internship (12 CFU) will be carried out in the manner indicated below. The internship activity is divided into:
1) Internal internship, consisting of a chemical activity carried out by the student at the Department of Chemistry of the University of Milan or the Departments connected to the Faculty of Science and Technology of the University of Milan under the guidance of a Supervisor, possibly assisted by a Co-Supervisor.

2) External internship, consisting of a chemical activity carried out by the student at the Departments connected to other Faculties of the University of Milan, or at public or private bodies or companies, under the guidance of a Manager (external Supervisor) and the supervision of a Tutor (internal Supervisor).

To start the internship the student must have achieved at least 126 credits.

The submission of the application can take place until the 1st day of each month for entry into the internship - unless not approved by the Board of Directors - on the 20th day of the same month, with the sole exception of the month of August.
The application for admission must be sent to the Didactic Office of the Department of Chemistry following the instructions and on the appropriate form available on the website https://chimicaindustriale.cdl.unimi.it/it/studiare/stage-e-tirocini
In the case of external internships at institutions or companies, students must contact the Thesis and Internship Commission in time to start the authorization procedure. In this regard, please consult the appropriate regulation, which can be found on the website of the CdS.
Students who are admitted to carry out the internship within the Erasmus project must apply before leaving for the destination university. In this case, the ECTS requirement is waived provided that the students have reached, on return, the 126 ECTS through exams taken abroad. Otherwise, the internship will not be valid for the purpose of obtaining the qualification.

The Supervisor is the guarantor towards the Academic Board of the activity assigned to the student in his internship and its correct performance.
Supervisor can be all professors and researchers, who carry out teaching activities of a chemical nature, belonging to the Academic Board or the Department of Chemistry or belonging to the Departments connected to the Faculty of Science and Technology. The Supervisor may be assisted by a Co-Supervisor.

They can be Internship Co-Supervisors, in addition to all the Teachers included in the category of Official Speakers:
- Official Professors of other Universities and Polytechnics, including foreign ones,
- graduates declared experts in the subject,
- employees of the University of Milan, classified in the role of non-teaching staff with a level equal to or higher than D and declared experts in the subject;
- C.N.R. researchers working within the Department of Chemistry;
- experts designated by the structures hosting external traineeships.

Special cases may be taken into consideration by the CD, if persons of particular scientific-technical relevance are involved. In this case, the Supervisor must briefly document in writing the specific competence of the proposed Co-Supervisor on the topic of thesis research.

In the case of an external internship, in addition to the Internal Supervisor, there is an External Supervisor (or Guardian) who is the didactic-organizational manager of the internship activity and is identified by the company hosting the internship.

Any anomalous cases will be examined by the Thesis and Internship Commission, which will formulate its decisions and submit them to the approval of the Academic Board.

Degree programme final exams

The final exam, which allows you to acquire the last 3 credits, consists in the discussion of a written report, prepared by the student under the guidance of the speaker, inherent in the activity carried out in the internship. This paper must relate to a theoretical or experimental activity carried out independently by the student in research groups or companies, during the internship period, and shall document the fundamental aspects of the work carried out in relation to the current state of knowledge in the field of chemistry.

SESSIONS FOR GRADUATION EXAMS
- July 2025

- October 2025
- December 2025
- February 2026
- April 2026

EXPERIENCE OF STUDY ABROAD AS PART OF THE TRAINING PROGRAM

The University of Milan supports international mobility by providing its students with the opportunity to spend study and internship periods abroad. It is a unique chance to enrich your educational path in a new exciting environment.
The agreements entered into by the University with over 300 universities from the 27 EU member countries under the European Erasmus+ programme allow regularly enrolled students to carry out part of their studies at one of the partner universities or to undertake internships at companies, training and research centres and other organizations.
Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

Study and internships abroad

As part of the study plan, students can participate in the Erasmus programme projects activated for the Degree Course. In particular, under the Erasmus+ programme, students can choose from 16 European partner universities. At these locations, students can obtain training credits by following courses and passing the relevant exams, or through the performance of part or all of the final internship. The acquisition of credits is subject to the approval, by the Teaching Board, of a specific study plan (Learning Agreement) and to the passing of the exams at the foreign university.
Interested students are kindly requested to make an appointment with the Tutor for International Mobility and Erasmus (prof. Emma Gallo, Tel. 02503 14374; E-mail: emma.gallo@unimi.it) for the investigation of the files.
Students can also participate in numerous seminar meetings with foreign lecturers.

How to participate in Erasmus mobility programs

The students of the University of Milan can participate in mobility programmes, through a public selection procedure.
Ad hoc commissions will evaluate:
- Academic career
- the candidate's proposed study programme abroad
- his/her foreign language proficiency
- the reasons behind his/her application

Call for applications and informative meetings
The public selection for Erasmus+ mobility for study generally begins around February each year with the publication of a call for applications specifying destinations and requirements. Regarding the Erasmus+ Mobility for Traineeship, the University of Milan usually publishes two calls a year enabling students to choose a destination defined by an inter-institutional agreement or to find a traineeship position on their own.
The University organizes informative meetings to illustrate mobility opportunities and rules for participation.
Erasmus+ scholarship
The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which may be supplemented by the University funding for disadvantaged students.

Language courses
Students who pass the selections for mobility programmes can benefit from intensive foreign language courses offered each year by the University Language Centre (SLAM).
https://www.unimi.it/en/node/8/
Learn more at https://www.unimi.it/en/node/274/

For assistance, please contact:
International Mobility Office
Via Santa Sofia 9 (second floor)
Tel. 02 503 13501-12589-13495-13502
Contacts: InformaStudenti; mobility.out@unimi.it
Student Desk booking through InformaStudenti

1st COURSE YEAR (disactivated from academic year 2024/25) Core/compulsory courses/activities common

Learning activity	Ects	Sector
Analytical chemistry with lab	12	CHIM/01
Complements of mathematics and calculus (F6X)	6	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05,

			MAT/06, MAT/07, MAT/08
English assessment B1 (3 ECTS)		3	NN
Fundamentals of mathematics		9	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
General and inorganic chemistry with lab		12	CHIM/03
General physics		9	FIS/08, FIS/07, FIS/06, FIS/05, FIS/04, FIS/03, FIS/02, FIS/01
Organic chemistry I		7	CHIM/06
	Total compulsory credits	58	

2nd COURSE YEAR (disactivated from academic year 2025/26) Core/compulsory courses/activities common

Learning activity		Ects	Sector
Analytic chemistry II with lab		12	CHIM/01
Inorganic chemistry with Lab		12	CHIM/03
Laboratory of physical chemistry		6	CHIM/02
Organic chemistry II		7	CHIM/06
Organic chemistry lab		10	CHIM/06
Physical chemistry I		6	CHIM/02
Physical chemistry II		6	CHIM/02
	Total compulsory credits	59	

3rd COURSE YEAR Core/compulsory courses/activities common

Learning activity		Ects	Sector
Biological chemistry		6	BIO/10
Chemical plants with lab		12	ING-IND/25
Industrial chemistry		6	CHIM/04
Macromolecular chemistry		6	CHIM/04
Physical chemistry Industrial		6	CHIM/02
Training		12	NN
	Total compulsory credits	48	

Elective courses

In the third year of the course, the student must acquire 12 CFUs by freely choosing from all the activities and teachings activated by the University that are functional to the training course of the Degree in Industrial Chemistry.
However, students are recommended to draw from this list of 6 CFU teachings designed specifically for the degree path.

Analysis applied to sustainable processes and industrial products	6	CHIM/01
Industrial surface treatment technologies	6	CHIM/02
Methods and technologies for organic synthesis	6	CHIM/06
Technologies for biomass valorisation	6	CHIM/03

End of course requirements

Final exam		3	NN
	Total compulsory credits	3	

COURSE PROGRESSION REQUIREMENTS

- The exams of "Fundamentals of mathematics" and "General and inorganic chemistry with lab" must be taken before the exams of the 2nd and 3rd year.
- The exams of "General physics" and "Complements of mathematics and calculus" must be taken before the exams of the 3rd year.
- The exams of "Organic chemistry I" must be carried out before those of "Organic chemistry lab", "Biological chemistry" and "Macromolecular chemistry".
- The “Physical chemistry I” and “Laboratory of physical chemistry" exams must be taken before the "Physical chemistry Industrial” exam.
- The exams indicated to as Course I must be taken before the corresponding exams indicated to as course II.

It is advisable, however, to take the exams of each semester before taking those of the following semesters.

Learning activity	Prescribed foundation courses	O/S
Biological chemistry	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	General physics	Core/compulsory
	Organic chemistry I	Core/compulsory
	Complements of mathematics and calculus (F6X)	Core/compulsory
Physical chemistry I	General and inorganic chemistry with lab	Core/compulsory

	Fundamentals of mathematics	Core/compulsory
Laboratory of physical chemistry	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Physical chemistry II	Physical chemistry I	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Inorganic chemistry with Lab	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Chemical plants with lab	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	General physics	Core/compulsory
	Complements of mathematics and calculus (F6X)	Core/compulsory
Organic chemistry lab	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	Organic chemistry I	Core/compulsory
Organic chemistry II	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	Organic chemistry I	Core/compulsory
Physical chemistry Industrial	Physical chemistry I	Core/compulsory
	Laboratory of physical chemistry	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	General physics	Core/compulsory
	Complements of mathematics and calculus (F6X)	Core/compulsory
Macromolecular chemistry	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	General physics	Core/compulsory
	Organic chemistry I	Core/compulsory
	Complements of mathematics and calculus (F6X)	Core/compulsory
Industrial chemistry	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	General physics	Core/compulsory
	Complements of mathematics and calculus (F6X)	Core/compulsory
Analytic chemistry II with lab	Analytical chemistry with lab	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory