UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2022/23
BACHELOR
Industrial Chemistry (Class L-27)
Students enrolled from the academic year 2009-2010

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:	1st , 2nd , 3rd
Access procedures:	Cap on student, student selection based on entrance test
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/

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

Didactic Office of the Department of Chemistry
Via Golgi, 19 - 20133 MILANO Phone 02 50314419 dal lunedì al venerdì dalle ore 10 alle ore 12, in altri orari previo appuntamento Email: didattica.dipchi@unimi.it

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 Phone 02503 14232 https://www.unimi.it/it/ugov/person/alberto-vertova 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 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 mathematical and physical disciplines.
In addition, it aims to achieve the following training 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 of a chemical-industrial nature, useful for insertion in work activities that require the ability to apply modern scientific methods and techniques.
The skills acquired allow graduates to carry out appropriate activities in specific professional fields, to interact with culturally contiguous professionals and to continue their studies in 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 the data obtained in the laboratory, to perform experimental procedures and to compile reports in this regard with reference to: synthesis and characterization of compounds, chemical-physical techniques and methodologies, recognition of 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 proposal of solution of analytical problems, placement of specific chemical knowledge in their relations with other disciplines, retrieval and screening of sources of information, data and chemical literature.

Graduates of the Industrial Chemistry course must be able to communicate the results of their analyses and evaluations in a clear and effective way, using the most widespread language in the international working contexts of reference (English) and using modern IT tools for the 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 with regard to bibliographic searches, databases and other information on the net, the acquisition of autonomy that allows to consult advanced textbooks and specialized journals in the research sectors of chemistry and scientific disciplines, and the ability to promptly enter the world of work.

Professional profile and employment opportunities

Graduates will possess knowledge suitable for carrying out professional activities, also contributing to activities such as the design and synthesis of new industrial products for the most varied uses and subsequently to follow their implementation in companies; to contribute to the testing and control of chemical production plants, as well as purification and depollution plants, guaranteeing their safety.
The industrial chemist can find employment in chemical and petrochemical, pharmaceutical, engineering industries and companies, related to different sectors (for example: plastics, dyes, detergents, adhesives, cosmetics, textiles, agri-food, energy) or operating in the environmental field. In the public sphere, graduates in Industrial Chemistry can work in technical and ecological offices of local authorities, in customs laboratories, in those of hygiene and prophylaxis and analysis or in accident prevention services at work.
In addition, in particular, graduates will possess knowledge suitable for carrying out professional activities and related functions in the following occupational areas:
- Research and Development of Products, Processes (carrying out laboratory tests for the development of new products, processes and formulations and the improvement of existing ones in compliance with current regulations and safety standards);
- Management and Operation of Production Plants (management of the operation of the plants in compliance with safety and the environment);
- Information and scientific dissemination.

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

Initial knowledge required

Qualifications and knowledge required for admission
Applicants to the Bachelor's degree programme in Industrial Chemistry must hold a high-school diploma or an equivalent international qualification pursuant to Ministerial Decree no. 270 of 22 October 2004. Other requirements include basic knowledge of mathematics and chemistry, as well as the ability to make simple logical deductions according to levels of competence not higher than those achieved through upper secondary-school education.

Admission assessment

Admission into the Bachelor's degree programme in Industrial Chemistry is capped at the local level in order to meet high-quality teaching standards relative to the available resources. There are 90 places available for the first year of the programme.

You may sit for the entrance test (TOLC -Test On Line CISIA) at the University of Milan or any other member university of CISIA (Consortium of Inter-University Integrated Access Systems). Register to the TOLC test on the CISIA website (www.cisiaonline.it).

The test required for admission to the degree programme in Industrial Chemistry is TOLC-S, consisting of the following sections: Basic mathematics (20 questions - 50 minutes), Reasoning and Problems (10 questions - 20 minutes), Reading comprehension (10 questions - 20 minutes), Basic sciences (chemistry, physics and geology - 10 questions - 20 minutes).

Each question has 5 answer options, of which only one is correct.

Score: +1 for a correct answer, -0.25 for a wrong answer, 0 for a no answer.

For more information on test structure and topics, visit: https://www.cisiaonline.it/en/area-tematica-tolc-scienze/struttura-della-prova-e-syllabus/.

The TOLC test includes an additional English section, consisting of 30 questions to be answered in 15 minutes. The score in this section does not affect the merit ranking, nor does it replace the for-credit assessment of English language proficiency required by the degree programme (see the language assessment section). However, it is a student self-assessment.

Students who have taken the TOLC-S test and intend to access the Bachelor's degree programme in Industrial Chemistry of the University of Milan must ALSO enrol in the selection process to be included in the merit ranking based on the test score. Winners may enrol by the deadlines set out in the call for applications.

The selection is divided into several time windows beginning in spring and ending in early September.

For more details on calls, deadlines and rankings, visit https://www.unimi.it/en/study/bachelor-and-master-study/degree-programme-enrolment/enrolment-first-degree-programme

Admission of transfer or graduate students

Students already enrolled in a degree programme at the University of Milan, or another University, as well as graduate students, can only be waived from the test requirement if they meet the requirements for admission to years following the first, i.e. they have earned at least 30 CFU for first-year exams, of which 9 available as transfer credits for the Fundamentals of Mathematics exam.

To this end, they will have to submit a specific request for prior assessment of their academic records using the online service as shown in the call for applications. These candidates must provide a full transcript of records (listing exams, subject areas, credits, grades) and attach the course syllabi. For more details, please refer to the call for applications.

The application will be reviewed by the degree programme's Transfer Board. If the applicant is not eligible for admission to years following Year I,

he/she will have to take the test and place high enough in the ranking.

The assessment application, with the transcript of records, must be submitted by the date that will be stated in the call and posted to the programme website.

The outcome will be notified via e-mail.

Students admitted to years subsequent to the first may enrol in compliance with the deadlines and procedures specified in the call for applications.

Students admitted to the first year will have to take the test and apply for admission, as per the call.

Similarly, all applications for exam equivalence/transfer credits must attach exam syllabi in order to expedite procedures.

Additional learning requirements (OFA) and remedial activities

Students who have not achieved at least 10 points in the Basics mathematics module will have to fulfil additional learning requirements (OFA).

Students with additional learning requirements will have to carry out remedial activities organised by the University in the period October-December, and then take a test to prove they have filled their gaps. Otherwise, they may not sit any first-year exams before passing the Fundamentals of Calculus exam, with the exclusion of the 3 credits for English language proficiency.

Compulsory attendance

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

Internship criteria

Students are required to undertake a final internship (12 credits) as specified below. There are two different kinds of internship:

1) On-campus internship: a chemistry-specific 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, and possibly a co-supervisor.

2) Off-campus internship: a chemistry-specific activity carried out by the student at the Departments connected to other Faculties of the University of Milan, or at public or private institutions or companies, under the guidance of an external supervisor and an internal supervisor. To start the internship, the student must have earned at least 126 CFU.

You can apply until the 1st day of any month to start the internship on the 20th of the same month - subject to the Academic Board's approval - with the exception of August.

Applications must be submitted to the academic office of the Department of Chemistry following the instructions and using the form available at https://chimicaindustriale.cdl.unimi.it/it/studiare/stage-e-tirocini

For internships at other institutions or companies, students must contact the Thesis and Internship Board in time to start the

authorization procedure. Please review the applicable regulations, which are available on the programme website.
Students who are admitted to an Erasmus internship must apply before leaving for the host university. In this case, the CFU requirement will be waived provided that the student reaches a total of 126 CFU by taking exams abroad. Otherwise, the internship will not be valid for the purpose of obtaining the degree.
The supervisor will guarantee for the quality of the student's work before the Academic Board.
All professors and research fellows who sit on the Academic Board or teach chemistry at the Department of Chemistry, or at the Departments connected to the Faculty of Science and Technology, may be supervisors. The supervisor may be assisted by a co-supervisor.
The following may be co-supervisors, in addition to all faculty members included in the category of official supervisors:
- Official lecturers of other Universities and Polytechnics, including international ones, - Graduates who are recognized experts in the subject,
- Non-teaching staff of the University of Milan who are recognized experts in the field, provided their employment level is equal to or higher than D;
- C.N.R. researchers operating within the Department of Chemistry;
- Experts designated by internship host facilities.
Special cases may be submitted to the Academic Board, provided the proposed co-supervisor is a high-level scientist. In this case, the supervisor will be required to briefly document in writing the subject-specific skills of the proposed co-supervisor.
For off-campus internships, in addition to the internal supervisor, there will be an external supervisor (or tutor) acting as the academic and organizational manager for the internship, who will be identified by the host institution.
Any anomalies will be reviewed by the Thesis and Internship Board, which will make its decisions and submit them to the Academic Board for approval.

Degree programme final exams

Upon completion of the internship, students will be required to write a short paper on their work, to be discussed before an examining board. The latter's assessment will count towards the degree mark. After the final interview, the board will deliver the end-of-internship report, countersigned by the supervisor(s), to the academic office of the Department of Chemistry.
For the student to be admitted to the graduation session, they must have passed all the exams required by the study plan (including the English language proficiency test) and obtained internship approval, for a total of 177 CFU.
FINAL EXAM SESSIONS
- July 2023
- October 2023
- December 2023
- February 2024
- April 2024

Notes

In order to obtain their degree, students must be proficient in English at a B1 level under the Common European Framework of Reference for Languages (CEFR). This proficiency level may be certified as follows:
- Through a language certificate, earned within three years prior to the date of submission, at a B1 level or higher. For the list of language certificates recognised by the University, please review: https://www.unimi.it/en/node/297/). The certificate must be uploaded during the enrolment procedure, or subsequently to the portal http://studente.unimi.it/uploadCertificazioniLingue;
- Through a Placement Test, which is delivered by the University Language Centre (SLAM) during year I only, from October to December. Students who fail the test will be required to take a SLAM course.
The Placement Test is mandatory for all students who do not hold a valid certificate.
Those who do not sit the Placement Test by December, or who fail to pass the end-of-course test within six attempts, must obtain a paid certificate by graduation.

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 Plus programme, students can choose from 16 European partner universities. At these locations, students can earn credits by following courses and passing the relevant exams, or by doing part or all of the final internship. The acquisition of educational credits is subject to the approval, by the Academic Board, of a specific study plan (the Learning Agreement) and to the passing of the exams at the foreign institution.

Interested students are kindly requested to make an appointment in time with the Tutor for International Mobility and Erasmus (prof. Emma Gallo, Tel. 02503 14374; E-mail: emma.gallo@unimi.it) for the instruction of files.
Students can also participate in the numerous seminar meetings with foreign lecturers.

How to participate in Erasmus mobility programs

How to participate in Erasmus+ mobility programmes

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 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	ND
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 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	NA
	Total compulsory credits	48	

Elective courses

End of course requirements

Final exam		3	NA
	Total compulsory credits	3	

COURSE PROGRESSION REQUIREMENTS

- The exams of "institutions of mathematics" and "general and Inorganic Chemistry / Laboratory of general and inorganic chemistry" must be taken before the examinations of the 2nd and 3rd year.
- The exams of "General Physics" and "complements of mathematics and numerical calculation" must be taken before the exams of the 3rd year.
- The exams of "Organic Chemistry I" must be carried out before those of "Laboratory of organic chemistry", "biological chemistry" and "Macromolecular Chemistry".
- “Physical Chemistry I” and “Laboratory of physical chemistry "tests must be carried out prior to" industrial Physical Chemistry”
- The exams indicated as the course must be taken before the corresponding examinations indicated as the course.

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