UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2023/24
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
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

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Tutor for teaching support
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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 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 will 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 Moderna) and using modern computer 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 research, databases and other information on the network, the acquisition of autonomy that allows you to consult advanced textbooks and specialized journals in the research sectors of chemistry and scientific disciplines, and the ability to be ready to enter the world of work.

Professional profile and employment opportunities

Graduates will be in possession of knowledge suitable to carry 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, ensuring their safety.
The industrial chemist can be used in chemical and petrochemical, pharmaceutical, metalworking 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 sector, 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 be in possession of knowledge suitable for carrying out professional activities and related functions in the following employment 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 plants in compliance with safety and the environment);

For the graduate of this class is expected to be enrolled in the Register of the National Federation of the Orders of Chemists and Physicists as a Chemist Iunior, upon passing the State Exam.

Initial knowledge required

Requirements and knowledge required for access
Candidates with a high school diploma or equivalent foreign qualification in accordance with Ministerial Decree 22 October 2004 n.270 can be admitted to the Bachelor's degree in Industrial Chemistry.
In addition, basic knowledge in mathematics, chemistry and the ability to operate simple logical deductions according to levels of competence not higher than those deriving from the preparation provided by the secondary school.

Methods of verification of knowledge and personal preparation

The degree course in Industrial Chemistry is at local programmed access in order to guarantee the quality of the teaching offer in relation to the available resources. 90 places are available for registration in the first year.

The access test requires the passing of a TOLC (CISIA Online Test), which can be taken at the University of Milan or any other University belonging to CISIA (Interuniversity Consortium Integrated Systems for Access). Registration for the TOLC must be made directly on the CISIA website (www.cisiaonline.it).

The TOLC valid for enrollment in the degree course in Industrial Chemistry is the TOLC-S, consisting of the following sections: Basic Mathematics (20 questions - 50 minutes), Reasoning and Problems (10 questions - 20 minutes), Text Comprehension (10 questions - 20 minutes), Basic Sciences (10 questions of chemistry, physics and geology - 20 minutes).

Each question presents 5 possible answers, of which only one is correct.

Score: +1 for each correct answer, -0.25 for each wrong answer, 0 for each answer not given.

Further information on the structure and topics of the test can be found at the following link:
https://www.cisiaonline.it/area-tematica-tolc-scienze/struttura-della-prova-e-syllabus/.

In the TOLC there is an additional section of English, consisting of 30 questions to be carried out in 15 minutes. The outcome of this section does not affect the ranking of merit, nor does it replace the assessment of the knowledge of the English language required by the degree course for the acquisition of the related credits (see the paragraph Language Tests), but constitutes a self-assessment for the student.

Students who have supported the TOLC-S intend to use it to access the Degree course in Industrial Chemistry of the University of Milan must also enroll in the appropriate selection to be included in the ranking of merit, formulated on the basis of the score reported in the test. The winners will be able to register within the deadlines indicated in the selection notice.

The selection is divided into several time windows with beginning in spring and ending in the first days of September.

For more details on the calls, deadlines and methods of admission in the ranking it is recommended to consult the page https://www.unimi.it/it/studiare/frequentare-un-corso-di-laurea/iscriversi/iscriversi-una-prima-laurea

Transfer or graduate student access

Students already enrolled in a Degree Course of the University of Milan, of another University or already graduated, can be exempted from the test only if they meet the requirements necessary to be admitted to years following the first, or at least 30 ECTS attributable to exams of the 1 anno

To this end, a specific request for prior career evaluation must be submitted by accessing the online service indicated in the admission notice. The interested parties must declare all the exams taken with related sectors, credits and grades and attach the programs of the courses. For more details on the procedure, please refer to the announcement.

The practice will be examined by the CD Transfer Commission. In the event that the applicant is not eligible for years following the first, the same must take the test and place himself in a useful position in the ranking.

The requests for evaluation, accompanied by the programs of the exams taken, must be submitted without delay by the date that will be published in the call and the outcome of the evaluation will be communicated by e-mail.

Students admitted to years following the first will be able to enroll within the deadlines and in the manner specified in the call.

Students admitted to the first year will have to take the test and submit the application for admission, as indicated in the notice.

Similarly, to speed up the procedure, all requests for equivalence of exams taken and/or recognition of previous careers must be accompanied by the programs of the exams taken.

Additional training obligations (OFA) and modalities for OFA recovery

Freshmen who in the Basic Mathematics module will not have achieved a score greater than or equal to 10, will be assigned Additional Training Obligations (OFA).

For students with OFA support activities will be organized in the period October-December, followed by a recovery test - to be carried out within the month of January of the calendar year following enrolment - with which the student will have to demonstrate that he has improved his preparation. In the absence of this evidence, the student will not be able to take any exam in the first year before having passed the exam of Mathematical Institutions, with the exclusion of the 3 ECTS relating to the knowledge of the English language.

For info: https://chimicaindustriale.cdl.unimi.it/it/studiare/le-matricole

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

Once the internship is over, it is necessary to write a short written paper on the work carried out that will be discussed before a Commission of the Teaching Board; This must express an evaluation that will contribute to the determination of the degree mark. Once the interview has been carried out, the commission delivers the report of the end of the internship, countersigned by the supervisor (s), to the Didactic Office of the Department of Chemistry.
To be admitted to the final official proclamation, the student must have passed all the exams required by the study plan (including the test of knowledge of the English language) and have obtained the approval of the internship, for a total of 177 credits.

SESSIONS FOR GRADUATION EXAMS
July 2024
October 2024
December 2024
February 2025
April 2025

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:
- By submitting a language certificate attesting B1 or higher level in English and issued no more than three years before the date of submission. You will find the list of language certificates recognized by the University at: 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;
- By taking a placement test offered by the University Language Centre (SLAM) between October and December of the first year (or in January for single-cycle programmes). Students who fail the test will be required to take a SLAM course.
The placement test is mandatory for all those who do not hold a valid certificate attesting to B1, B2, or higher level.

Those who have not taken the placement test by the end of December (end of January for single-cycle programmes) or fail the end-of-course exam six times must obtain the necessary certification privately before graduating.

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 Erasmus program projects activated for the Degree Course. In particular, under the Erasmus Plus programme, students can choose from 16 affiliated European universities. At these locations, students can obtain training credits by following the teachings and passing the relevant exams, or through the performance of part or all of the final internship. The acquisition of training credits is subject to the approval, by the Didactic College, of a specific study plan (the Learning Agreement) and the passing of exams at the foreign office.
Interested students are 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 practices.
Students can also participate in the numerous seminar meetings with foreign teachers.

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	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 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 credits freely choosing among all the courses activated by the University that are functional to the training course of the Bachelor's Degree in Industrial Chemistry.
Students are advised to draw from the list of 6 CFU courses of the Master's Degrees in Chemical Sciences and Industrial Chemistry.

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