



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2023/24
BACHELOR
Chemistry (Classe L-27)
Students enrolled from the academic year 2011-2012

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:	Cap on student, student selection based on entrance test
Course code:	F5X

PERSONS/ROLES

Head of Study Programme

Prof. Luigi Falciola

Degree Course website

<https://chimica.cdl.unimi.it/it>

Department of Chemistry

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

Department of chemistry teaching office

Sig. Antonino Nucera, via Golgi, 19 - 20133 MILANO Phone 02 50314419 dal lunedì al venerdì ore 10.00-12.00, in altri orari su appuntamento Email: didattica.dipchi@unimi.it

DSA and disability tutors

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Entrance guidance tutors

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

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Student administration offices

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Study plan, transfer and credit recognition tutor

Pierluigi Mercandelli Phone 02503 14447 Email: pierluigi.mercandelli@unimi.it

Tutor for teaching support

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CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The course aims to achieve the following training objectives:

- provide adequate knowledge of the different sectors of chemistry, in the basic, theoretical, experimental and applicative

aspects and an adequate basic preparation in mathematical and physical disciplines;

- provide adequate mastery in the use of chemical knowledge in relation to other scientific and technical disciplines;
- provide a good knowledge of experimental laboratory methods;
- provide adequate basic knowledge of a chemical nature, useful for insertion in work activities that require familiarity with the scientific method;
- develop the ability to apply innovative methods and techniques and to use complex equipment;
- develop the ability to adapt to the evolution of the discipline, to interact with culturally contiguous professionals and to continue studies in Master's Degree courses.

Expected learning outcomes

- Acquisition of theoretical and operational skills with reference to the main fields of chemistry and safety standards to be implemented in chemical laboratories.
- Ability to collect, analyse and process laboratory data, to carry out experimental procedures and to draw up reports, to safely use and dispose of chemicals properly.
- Conscious autonomy of judgment: ability to interpret experimental laboratory data, conduct of experiments, proposal of solution of analytical problems, collocation of specific chemical knowledge in their relations with other disciplines, finding and screening of sources of information, data and chemical literature.

Graduates in Chemistry will have to be able to communicate the results of their analyses and evaluations clearly and effectively using word processing systems and modern techniques of multi-media presentation, even in the most widely used language in the contexts of the international labour reference (English) for the preparation and the reports of the laboratory courses and training activities. They will also have to be able to work in groups and to work independently.

The expected learning outcomes are: the acquisition of appropriate skills for the development and updating of skills in bibliographic research, databases and other information on the internet, the acquisition of autonomy to consult advanced textbooks and journals specialised in the fields of research in chemistry and scientific disciplines, and the ability to be readily integrated into the world of work.

Professional profile and employment opportunities

Graduates will possess knowledge suitable for carrying out professional activities and related functions in the following occupational areas:

- in chemical and pharmaceutical research
- in the fields of synthesis of new products and new materials, applying the disciplinary methods of investigation acquired
- in the realization, analysis and characterization of new products
- in the experimentation of new technologies
- in the study of solutions for product improvement, analysis, synthesis and characterization

Employment opportunities are in the chemical industry, with particular regard to fine chemicals, the pharmaceutical industry and research and development laboratories, both in the public and private sectors and in particular in public and private research institutions, analyze, control and quality certification laboratories and industries and work environments that require basic knowledge in the chemical sectors.

The course prepares for the professions of Chemist and Researcher in chemical and pharmaceutical sciences.

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

Since from the academic year 2022-2023 the Degree course in Chemistry - to keep up with the new trends that are emerging in the professional fields - is revisited in some basic and characterizing courses, this edition of the Manifesto is reserved for students enrolled until the academic year 2021-2022. Therefore, for the modalities of access to the updated Degree Course in Chemistry, it is necessary to consult the Study Manifesto valid for students who will enroll starting from the academic year 2022-2023, available on the sito

However, students already enrolled in a Degree Course of the University of Milan, of another University or already graduated, if they hold at least 30 ECTS attributable to exams of the 1st year of the course, of which 9 can be validated for the purpose of the examination of Mathematical Institutions, can request to be admitted to one year following the first year of the course, with the exemption from the access test for the matriculation in the first year of the new Degree in Chemistry.

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 the third year, 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 admission notice.

The outcome of the evaluation will be communicated by email.

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 process of the practices, 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 at laboratory activities is mandatory, in all other cases it is strongly recommended.

Internship criteria

At the end of the course of study, a compulsory internship (12 ECTS) will be carried out in the following ways. The internship activity is distinguished in:

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-rapporteur.

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 institutions or companies, under the guidance of a Manager (External Speaker) and the supervision of a Tutor (Internal Speaker).

To start the internship, the student must have earned at least 126 ECTS.

The submission of the application for entry into the internship may take place until the 1st day of each month for entry into the internship - unless approved by the Didactic College - 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 Teaching Office of the Department of Chemistry following the instructions and on the appropriate form available on the site <https://chimica.cdl.unimi.it/it/studiare/stage-e-tirocini>

In the case of external internships with institutions or companies, students must contact the Department of Chemistry's Teaching Office in time to start the authorization procedure.

Students who are eligible to carry out the internship under the Erasmus project must apply before departure for the destination university. In this case, the CFU requirement is disregarded as long as the students have reached, on return, the 126 CFU through exams taken abroad. Otherwise, the internship will not be valid for the purpose of obtaining the degree.

The Supervisor is the guarantor of the activity assigned to the student in his internship and of its correct performance. All professors and researchers, who carry out chemical teaching activities, belonging to the Didactic College or the Department of Chemistry or belonging to the Departments connected to the Faculty of Science and Technology, can be Speakers. The Rapporteur may be assisted by a Co-rapporteur. They can be Internship Co-Rapporteurs, in addition to all Teachers included in the category of Official Speakers:

- the Official Teachers of other Universities and Polytechnics, including foreigners;
- graduates declared to be lovers of the subject;
- the employees of the University of Milan, framed in the role of non-teaching staff with a level equal to or higher than D and declared lovers of the subject;
- C. N. R. researchers working within the Department of Chemistry;
- the experts designated by the structures hosting the external internships.

Special cases may be taken into account by the CD, if people of particular scientific and technical importance are involved. In this case, the Rapporteur must briefly document in writing the specific competence of the proposed Co-Rapporteur on the subject of thesis research.

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

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

For all forms, please refer to the website <https://scienzechimiche.cdl.unimi.it/it/studiare/stage-e-tirocini>

Degree programme final exams

Once the internship is finished, it is necessary to draw up a short written paper on the work done that will be discussed before a Commission of the Didactic College; this will have to express an evaluation that will contribute to the determination of the degree grade. 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 Teaching Office of the Department of Chemistry.

To be admitted to the final official proclamation, the student must have passed all the exams provided for in 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 CFU.

SESSIONS FOR GRADUATION EXAMS

- July 2024
- October 2024
- December 2024

- February 2025
- April 2025

Notes

ADMISSION REQUIREMENTS

Since from the academic year 2022-2023 the Degree course in Chemistry - to keep up with the new trends that are emerging in the professional fields - is revisited in some basic and characterizing courses, this edition of the Manifesto is reserved for students enrolled until the academic year 2021-2022. Therefore, for the modalities of access to the updated Degree Course in Chemistry, it is necessary to consult the Study Manifesto valid for students who will enroll starting from the academic year 2022-2023, available on the sito

However, students already enrolled in a Degree Course of the University of Milan, of another University or already graduated, if they hold at least 30 ECTS attributable to exams of the 1st year of the course, of which 9 can be validated for the purpose of the examination of Mathematical Institutions, can request to be admitted to the third year of the course, with the exemption from the access test for matriculation in the first year of the new Degree in Chemistry.

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 related fields, credits and grades and attach the course programs. 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 the third year, the same must take the test and place himself in a useful position in the ranking.

The evaluation requests, accompanied by the programs of the exams taken, must be submitted by the date that will be published in the notice and also with notice on the website of the degree course.

The outcome of the evaluation will be communicated by email.

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.

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 curriculum, students can participate in Erasmus Programme projects activated for the degree course. In particular, under the Erasmus + programme, students can choose from 16 affiliated European universities. At these locations, students can obtain training credits by following the teachings and passing the related exams, or by carrying out part or all of the final internship. The acquisition of training credits is subject to the approval, by the Teaching College, of a special study plan (learning Agreement) and the passing of the exams at the Foreign Office.

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 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 (disactivated from academic year 2022/23) Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Analytical chemistry I with lab	12	CHIM/01
Complements of mathematics and calculus	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 (disactivated from academic year 2023/24) Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Analytical chemistry II with lab	12	CHIM/01
Biological chemistry	6	BIO/10
Inorganic Chemistry	8	CHIM/03
Organic chemistry II	7	CHIM/06
Organic chemistry lab	10	CHIM/06
Physical chemistry I	6	CHIM/02
Physical chemistry I laboratory	6	CHIM/02
Total compulsory credits		55
Elective courses		
In the second year of the course the student must acquire 6 CFU by freely choosing among all the courses activated by the University that are functional to the training course of the LT in Chemistry.		
Students are advised to choose from the list of 6 CFU teachings of the LM in Chemical Science and Industrial Chemistry.		
3rd COURSE YEAR Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Chemistry of coordination compounds with laboratory	10	CHIM/03
Instrumental analytical chemistry applications	6	CHIM/01
Organic chemistry advanced	6	CHIM/06
Physical chemistry II with lab	12	CHIM/02
Physical chemistry III	6	CHIM/02
Training	12	NA

Total compulsory credits		52
Elective courses		
In the third year of the course the student must acquire 6 CFU by freely choosing among all the courses activated by the University that are functional to the training course of the LT in Chemistry. Students are advised to choose from the 6 CFU teachings of the LM in Chemical Science and Industrial Chemistry.		
End of course requirements		
Final exam		3 NA
Total compulsory credits		3

COURSE PROGRESSION REQUIREMENTS

- The exams of Mathematical Institutions and "General and Inorganic Chemistry/Laboratory of General and Inorganic Chemistry". must be taken before the 2nd and 3rd year exams.
- The "General Physics" exams and "Complements to Mathematics and Numerical Calculus"... must be taken before the 3rd year exams.
- The exams of "Organic Chemistry I" must be supported before those of "Organic Chemistry Laboratory", of "Biological Chemistry". and "Insights in Organic Chemistry."
- The exams of "Organic Chemistry II" must be supported before the one in "Deepening Organic Chemistry".
- The exams indicated as Course I must be taken before the corresponding exams indicated as Course II, which in turn must be taken before the corresponding exams indicated as Course III.

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
Chemistry of coordination compounds with laboratory	General physics	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Complements of mathematics and calculus	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Organic chemistry II	General and inorganic chemistry with lab	Core/compulsory
	Organic chemistry I	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Organic chemistry lab	General and inorganic chemistry with lab	Core/compulsory
	Organic chemistry I	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Physical chemistry I laboratory	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Organic chemistry advanced	Organic chemistry II	Core/compulsory
	General physics	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Organic chemistry I	Core/compulsory
	Complements of mathematics and calculus	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Biological chemistry	General and inorganic chemistry with lab	Core/compulsory
	Organic chemistry I	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Analytical chemistry II with lab	General and inorganic chemistry with lab	Core/compulsory
	Analytical chemistry I with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Instrumental analytical chemistry applications	General physics	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Complements of mathematics and calculus	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Physical chemistry I	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
Physical chemistry II with lab	General physics	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Complements of mathematics and calculus	Core/compulsory
	Fundamentals of mathematics	Core/compulsory
	Physical chemistry I	Core/compulsory
Physical chemistry III	General physics	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Complements of mathematics and calculus	Core/compulsory
	Fundamentals of mathematics	Core/compulsory

Inorganic Chemistry	Physical chemistry I	Core/compulsory
	Physical chemistry II with lab	Core/compulsory
	General and inorganic chemistry with lab	Core/compulsory
	Fundamentals of mathematics	Core/compulsory