UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2022/23
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:	2nd , 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
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

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Referent of the Quality Management System (QA) of The Bachelor's degree
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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
Alberto Vertova Phone 02503 14232 Email: tutoring.chimica@unimi.it

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, Researcher in chemical and pharmaceutical sciences, Chemical laboratory graduate technician and scientific informant and popularizer.
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.

Notes

ADMISSION REQUIREMENTS
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 secondary-school education.
Enrolment in the Bachelor's degree programme in Chemistry is capped in order to meet high-quality teaching standards relative to the available resources. Therefore, admission is subject to a TOLC - CISIA Online Test. There are 130 places available for the first year of the programme.
You can sit for the TOLC test at the University of Milan or any other member university of CISIA (inter-university consortium for integrated access systems). You can register to the TOLC test on the CISIA website (www.cisiaonline.it).
The test providing access to the degree programme in 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: correct answer +1, wrong answer -0.25, no answer 0.
You can find information on the test structure and topics at https://www.cisiaonline.it/area-tematica-tolc-scienze/struttura-della-p…
The TOLC-S test provides access to various degree programmes throughout Italy, both in the chemical and non-chemical fields. Students who have taken the TOLC-S test and intend to access the Bachelor's degree programme in 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. The winners will be able to enrol, in compliance with 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 the calls for applications, deadlines and procedures for admission to the ranking list, please review the page https://www.unimi.it/en/study/bachelor-and-master-study/degree-programme-enrolment/enrolment-first-degree-programme
Students who have not scored at least 10 in the Basic Mathematics module will have to meet additional learning requirements (OFA).
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. However, it is a student self-assessment.
Remedial activities and tests
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 will not be able to take any first-year exams before passing the Fundamentals of Mathematics exam, with the exclusion of the 3 credits (CFU) for English language proficiency.

TRANSFERS AND GRADUATE STUDENTS
Those 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.
For this purpose, candidates will have to submit a specific application to the Academic Office of the Department of Chemistry attaching a self-certification of their academic career, including exams taken, syllabi and CFU earned.
The case will be reviewed by the degree programme's Transfer Commission. Any applicants who cannot be admitted to years following the first will have to take the test and rank high enough to be admitted to the programme.
Applications, possibly including exam syllabi, must be submitted by 10 JULY 2020 to the Academic Office of the Department of Chemistry via email (didattica.dipchi@unimi.it). The review outcome will be posted on the website https://chimica.cdl.unimi.it/it by the end of July. In the event of a positive outcome, the candidate will have to apply for enrolment as set out by the Student Registrar division, and claim transfer credit for their previous career attaching exam syllabi.
Similarly, all applications for exam equivalence/career recognition must attach exam syllabi in order to expedite procedures.

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