



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2020/21
MASTER DEGREE
Chemistry (Classe LM-54)
Students enrolled from the accademic year 2020-2021

HEADING

Degree classification - Denomination and code:	LM-54 Chemistry
Degree title:	Dottore Magistrale
Length of course:	2 years
Credits required for admission:	180
Total number of credits required to complete programme:	120
Years of course currently available:	1st , 2nd
Access procedures:	Open, subject to entry requirements
Course code:	F5Y

PERSONS/ROLES

Head of Study Programme

Prof. Luigi Falciola

Degree Course website

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

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

Via Celoria, 18 - 20133 MILANO Phone 0250325032 <https://www.unimi.it/it/node/360> <https://www.unimi.it/it/node/359/>

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Erasmus and international mobility tutor

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Internship and dissertation tutor

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Master's degree admission tutor

Luigi Lay Phone 02503 14062 <https://www.unimi.it/it/ugov/person/luigi-lay> Email: luigi.lay@unimi.it

Office for Didactic, Department of Chemistry

Via Golgi 19 - 20133 MILANO Phone 02 50314419 dalle ore 10 alle ore 12 dal lunedì al venerdì, in altri orari previo appuntamento Email: didattica.dipchi@unimi.it - skype: [segreteriachimica](https://www.skype.com/join/segreteriachimica)

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

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The Master in Chemical Sciences will be awarded to students who have shown:

- To have knowledge and understanding that is founded upon and extends that of the Bachelor's level in Chemistry, and that provides a basis for originality in developing and applying ideas within a research context;
- To have competences which fit them for employment as professional chemists in chemical and related industries or in public service;
- To have attained a standard of knowledge and competence which will give them access to third cycle course units or degree programmes.

Such graduates will:

- have the ability to apply their knowledge and understanding, and problem solving abilities, in new or unfamiliar environments within broader (or multidisciplinary) contexts related to chemical sciences;
- have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on ethical responsibilities linked to the application of their knowledge and

judgements;

- have the ability to communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously;
- have developed those learning skills that will allow them to continue to study in a manner that may be largely self-directed or autonomous, and to take responsibility for their own professional development.

Expected learning outcomes

The master's degree in Chemical Sciences has the ability and knowledge to carry out highly qualified professional activities in the field of business management and research laboratories in the chemical and chemical-pharmaceutical field. He possesses, in addition to an in-depth knowledge of Chemical Science and technology and management tasks, also the rigor necessary to apply the scientific method on time.

It is able to organize the work of research, to define the themes of development and related programs, to assure the integration of the joint of the various areas of research, to ensure scientific as well as to verify the results achieved and to promote their development, and their application and has the ability to adapt to the evolution of the chemical disciplines, and to interact with the professional and culturally contiguous.

Professional profile and employment opportunities

The students with the degree in Chemical Sciences would be entitled to work in public and private-owned laboratories as highly qualified scientists. They could supervise the planning, production and characterization of new products and/or new materials, collaborate in the development of novel technologies, elaborate reports, handle and present chemical information. They could find positions in chemical industry, especially in pharmaceutical and fine chemicals companies, but also in the agrochemical, cosmetic and food chemistry, or teach Chemistry in High Schools.

They can also apply for Doctorate programmes, preferentially in Chemical Sciences, in our University or abroad. On average, around 25% of our students do so, after receiving the degree in Chemical Sciences.

Notes

ADMISSION REQUIREMENTS

Graduates in Chemical Science and Technology (Class L-27, or Class 21 under Ministerial Decree 509/99) from any Italian university can access the Master's degree programme in Chemistry, provided they meet all curricular requirements.

Graduates of any other degree class from any Italian university, as well as those holding a qualification obtained abroad and recognized as suitable, can also access the programme, provided they meet curricular requirements. Italian and foreign students with an academic qualification obtained in Italy must apply for admission in the period posted on the website <https://www.unimi.it/en/education/chemistry-0> by the Student Registrar division. Students who will graduate by 31 December 2020 may also apply.

Candidates must meet curricular and extra-curricular requirements, to be assessed by a Commission appointed by the Chemistry Academic Board, with at least three teachers from the degree programme.

Applicants must satisfy both curricular and extra-curricular requirements.

For graduates from Class L-27 Bachelor's degree programmes of the University of Milan, all credits previously earned will count towards curricular requirements.

All other students must prove that they meet Class L-27 curricular requirements. More specifically, they must satisfy the following requirements:

- at least 20 credits (CFU) in mathematics, computer science and physics
- at least 70 CFU in the following academic fields (SSD): CHIM/01-06, CHIM/12, ING-IND/21-22, ING-IND/25 and BIO/10-12

Any credits earned in other fields will be assessed by the Commission for admission to the degree programme.

Extra-curricular requirements will be assessed as follows:

a) The candidate must pass the European Chemistry test (<http://ectn.eu/committees/virtual-education-community/echemtest/>) provided by the European Chemistry Thematic Network for the assessment of chemistry skills. The test includes multiple-choice questions in English on topics grouped into four sections: Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

An identification document is required to sit for the test.

In order to pass the test, the candidate must answer correctly at least 16% of the questions in each section.

b) After passing the test, the candidate will be admitted to an interview with the Admission Commission, which will focus on subjects covered in the fundamental courses of the degree programme in Chemistry.

Candidates can also take the test and the interview before graduating (provided they obtain their degree by 31 December 2020 for the purposes of matriculation), without prejudice to the above-listed curricular requirements.

Candidates who do not pass the interview cannot access the Master's degree programme for the current year.

ALL CANDIDATES, INCLUDING THOSE WHO PLAN TO GRADUATE BY 31 DECEMBER 2020, ARE INVITED TO ATTEND THE FIRST ADMISSION INTERVIEW.

The EChemTest will take place on 24 September 2020, at 8.30 am, in the classrooms of the teaching sector at Via Celoria 20, Milan. Interviews will be held the next day in the afternoon, to ascertain curricular and extra-curricular requirements.

A further session of the EChemTest will take place on 11 December 2020, at 8.30 am, in the classrooms of the teaching sector at Via Celoria 20, Milan, with a subsequent interview to ascertain curricular and extra-curricular requirements.

Foreign students who cannot participate in the official selections due to visa issues will be contacted by the Admission Commission for a review of their CV, and possibly a Skype interview. Please note that, in order to access the Master's degree programme in Chemistry, non-EU students residing abroad must pass an Italian language test. Please review the test dates

and procedures at <https://www.unimi.it/en/international/coming-abroad/enrol-programme/international-enrolment-degree-programmes>

It is advisable to check for any date/time changes on the degree programme website <https://scienzechimiche.cdl.unimi.it/en>

To obtain the degree, students are required to demonstrate an English language proficiency at level B2 within the Common European Framework of Reference for Languages (CEFR). This level can be assessed in the following ways:

- by submitting the language certificate achieved no more than three years prior to the submission, at level B2 or higher, recognised by the University (the list of recognised language certificates can be found at <https://www.unimi.it/en/node/297/>). The language certificate must be uploaded during the admission process;
- by taking the Placement Test, organised by SLAM exclusively during the first year, from October to January. Students who fail to reach level B2 will have to attend an English course organised by SLAM. The Placement Test is compulsory for all students who do not have a valid language certificate.

Students who do not take the Placement Test within the deadline and students who fail the SLAM end-of-course test within six attempts will have to obtain a language certificate within the year in which the language exam is scheduled.

LEVEL OF ENGLISH ASSESSED THROUGH A COMPUTER-BASED TEST DURING THE BACHELOR'S DEGREES OBTAINED AT THE UNIVERSITY OF MILAN.

English levels B2 achieved no more than four years previously are deemed valid. The verification is automatic with no need to attach any certificate during the application phase.

EXPERIENCE OF STUDY ABROAD AS PART OF THE TRAINING PROGRAM

The University of Milan supports the international mobility of its students, offering them the opportunity to spend periods of study and training abroad, a unique opportunity to enrich their curriculum in an international context.

Study and internships abroad

Students enrolled at the Master in Chemical Sciences course are encouraged to apply to the Erasmus Plus actions, where various positions are available in 20 European universities. They can earn their credits by following courses and/or by performing part of their experimental thesis abroad. Before leaving, students must submit a Learning Agreement to be approved by the Teaching Board: this approval is mandatory for the acquisitions of the credits.

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, which last 3 to 12 months, through a public selection procedure.

Ad hoc commissions will evaluate:

- 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 generally begins around February each year with the publication of a call for applications specifying the destinations, with the respective programme duration, requirements and online application deadline.

Every year, before the deadline for the call, the University organizes informative meetings to illustrate opportunities and rules for participation to students.

Erasmus+ scholarship

The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which is 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.

Learn more at <https://www.unimi.it/en/international/study-abroad/studying-abroad-erasmus>

For assistance, please contact:

International Mobility Office

Via Santa Sofia 9 (second floor)

Tel. 02 503 13501-12589-13495-13502

E-mail: mobility.out@unimi.it

Desk opening hours: Monday to Friday 9 am - 12 noon

1st COURSE YEAR Core/compulsory courses/activities common		
Learning activity	Ects	Sector
English proficiency B2 (3 ECTS)	3	ND
Total compulsory credits		3
Elective courses		
The student must choose 2 from the following courses		
Inorganic chemistry A	9	CHIM/03
Inorganic Chemistry B	9	CHIM/03
Organic chemistry A	9	CHIM/06
Organic chemistry B	9	CHIM/06
Physical chemistry A	9	CHIM/02
Physical chemistry B	9	CHIM/02
Student must earn 12 CFU by selecting 2 of the following items following teachings related and integrative.		
Chemical Safety	6	IUS/07
Mathematical methods applied to chemistry	6	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
Medicinal chemistry	6	CHIM/08
Patents and Management of Innovation	6	SECS-P/07
Programming C	6	INF/01
The articulation of the courses in the semesters is described in the section "articulation of the courses".		
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NOTA BENE: THE COURSES DENOMINATED IN ENGLISH ARE KEPT IN THIS LANGUAGE		
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2nd COURSE YEAR Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Thesis work and Final dissertation	39	NA
Total compulsory credits		39
Elective courses		
The student must earn 12 credits by choosing freely between all the teachings activated, offered by the University, provided they consistency with the educational project, even if they are held in Italian.		
However, it is strongly recommended to use distinctive or, as appropriate, elective or integrative courses of the Related and Integrative courses of of the Chemical Master's Degrees consistent with the educational project.		
Further elective courses		
TABLE 2		
In the first and second year the student must choose, from the following table, courses for a total of 36 CFUs so that		
- at least 6 credits belong to the chemical-analytical and environmental disciplines: CHIM/01 and CHIM/12		
- at least 6 credits belong to the chemical-organic disciplines: CHIM / 06		
- at least 12 credits belong to the disciplinary field "chemical-inorganic and chemical-physical disciplines": CHIM/03 and CHIM/02.		
It is considered useful to point out that in the next academic year will be active also the course "Catalytic Processes". (6 CFU - CHIM/02).		
Advanced electroanalytical chemistry	6	CHIM/01
Advanced methods in organic synthesis	6	CHIM/06
Advanced physics methods in organic chemistry	6	CHIM/06
Bioinorganic chemistry	6	CHIM/03
Bioorganic chemistry	6	CHIM/06
Catalytic Methodologies in organic chemistry	6	CHIM/06
Catalytic processes	6	CHIM/02
Chemistry of heterocyclic compounds	6	CHIM/06
Chemistry of organic natural substances	6	CHIM/06
Crystal Chemistry	6	CHIM/02
Databases and Cheminformatics Fundamentals	6	CHIM/06
Electrochemistry	6	CHIM/02
Environmental analytical chemistry	6	CHIM/01
Environmental chemistry	6	CHIM/12
Environmental elettrochemistry	6	CHIM/02
Homogeneous catalysis	6	CHIM/03

Nanoparticles: Chemistry and Applications	6	CHIM/06
Organometallic chemistry	6	CHIM/03
Photochemistry	6	CHIM/02
Photoluminescence and magnetic resonance: applications in organometallic and inorganic chemistry	6	CHIM/01
Physical chemistry of disperse systems and of interfaces	6	CHIM/02
Physical chemistry of solid state and surface	6	CHIM/02
Physico-chemical methods of investigation applied to molecular systems and nanostructured	6	CHIM/02
Quantum chemistry	6	CHIM/02
Simulation modeling of biomolecules	6	CHIM/02
Solid state chemistry	6	CHIM/03
Special synthesis techniques in organic chemistry	6	CHIM/06
Structural biology and enzymology	6	BIO/10
Structural chemistry	6	CHIM/03
Supramolecular chemistry	6	CHIM/03
Synthesis and applications of inorganic materials	6	CHIM/03
Theoretical chemistry	6	CHIM/02