Master Degree
in Chemical Sciences

Curriculum in force from the academic year 2025-26

Key Points

- Maintain a solid basic preparation
- Upgrade the contents
- Increase the laboratory activities

Modify the current characterizing courses, separating the laboratory courses

New contents in laboratory courses (ita/eng), 3* modules organized in courses of 6 CFU

New similar, different for the two paths (Italian or English)

Divided into two curricula split for the language: Scienze Chimiche and Chemical Sciences

Same characterizing theory courses
Different characterizing courses for laboratories

Different related courses
Different elective courses, possibility for students to choose regardless of language

Same internship activities

Possibility to carry out the thesis and exams at partner universities to acquire the "Double degree"

Possibility to carry out the thesis and exams at an Italian (Italian Erasmus) or foreign (Erasmus) university

Flexible teaching organization

Outline of the curriculum, 12 exams per student

All courses of 6 CFU

8 core courses (48 CFU):
5 of theory
3 integrated courses of laboratory (chosen from the 5 offered), modules of 3+3

2 related/supplementary courses (12 CFU):

2 elective courses (12 CFU):
chosen from a shortlist including several courses or at student's choice

Internship + foreign language (10 CFU):

Other activities + thesis (38 CFU, divided into 6 + 32)

Very high flexibility in the distribution of activities between the first and second year

Compulsory characterizing courses for all students

Scienze Chimiche

Title	SSD	CFU
Biochimica Avanzata	BIOS-07/A	6
Chimica Analitica Avanzata	CHEM-01/A	6
Complementi di Chimica Fisica	CHEM-02/A	6
Chimica Inorganica Superiore	CHEM-03/A	6
Chimica Organica Avanzata	CHEM-05/A	6

Chemical Sciences

Title	SSD	CFU
Advanced Biochemistry	BIOS-07/A	6
Advanced Analytical Chemistry	CHEM-01/A	6
Advanced Physical Chemistry	CHEM-02/A	6
Advanced Inorganic Chemistry	CHEM-03/A	6
Advanced Organic Chemistry	CHEM-05/A	6

Characterizing courses (compulsory, choose 3/5)

At least one module for each "subject" (SSD)

Scienze Chimiche

Title	Module Title	SSD	CFU
Proteomica e Metabolomica	Proteomica Metodi analitici in metabolomica	BIOS-07/A CHEM-01/A	3 3
Caratterizzazione Strutturale In Stato Solido e Soluzione	Caratterizzazione strutturale in stato solido Caratterizzazione in soluzione	CHEM-03/A CHEM-01/A	3 3
Biosintesi e caratterizzazione strutturale di proteine	Produzione e purificazione di proteine ricombinanti Laboratorio di struttura di proteine	BIOS-07/A CHEM-02/A	3 3
Metodi di Spettroscopia Molecolare	Laboratorio di Spettroscopia NMR Laboratorio di Spettroscopia vibrazionale	CHEM-05/A CHEM-02/A	3 3
Metodologie di sintesi e caratterizzazione	Laboratorio di chimica di coordinazione Laboratorio di sintesi organica stereocontrollata	CHEM-03/A CHEM-05/A	3 3

Insegnamenti Caratterizzanti (sceglierne obbligatoriamente 3/5)

Almeno un modulo per ogni «materia» (SSD)

Chemical Sciences

Title	Module Title	SSD	CFU
Integrated modeling approaches in molecular catalysis: from ab initio to data driven	First principle techniques for data driven approaches High throughput experimentation, feature generation and data science approaches	CHEM-02/A CHEM-03/A	3 3
Biocatalysis	Bioinorganic catalysis Enzymology	CHEM-03/A BIOS-07/A	3 3
Bioprocesses for production of organic bioactive compounds	Isolation and structural characterization of organic bioactive compounds Bioprocesses and biotrasformations	CHEM-05/A BIOS-07/A	3 3
Nanoparticle Functionalization for Sensing Applications	Synthetic strategies for nanoparticle funcionalization with target-responsive organic molecules Detection and quantification of target analytes using nanosensors	CHEM-05/A CHEM-01/A	3 3
Chemical methods for the environment	Methods and models for environmental applications Analytical chemistry methodologies for the environment	CHEM-02/A CHEM-01/A	3 3

Related Courses (Italian)

Scienze Chimiche

2 courses, distributed at the student's choice

Title	SSD	CFU
Chimica Analitica Forense	CHEM-01/A	6
Chimica dell'ambiente	CHEM-01/B	6
Chimica fisica delle energie rinnovabili	CHEM-02/A	6
Termodinamica di non equilibrio per sistemi chimici, biologici ed ambientali	CHEM-02/A	6
Chimica e Tecnologia della Catalisi	CHEM-03/A	6
Chimica dei composti metallorganici	CHEM-03/A	6
Biologia Molecolare	BIOS-08/A	6
Chimica delle sostanze organiche naturali	CHEM-05/A	6
Metodologie speciali in sintesi organica	CHEM-05/A	6
Chimica dei materiali: dai catalizzatori al design dei materiali	CHEM-04/A	6

Related Courses

Chemical Sciences

2 courses, distributed at the student's choice

Title	SSD	CFU
Chemistry of cultural heritage	CHEM-01/B	6
Soft matter and nanosystems	CHEM-02/A	6
Modelling of the photoinduced processes for Earth and space	CHEM-02/A	6
Inorganic hybrid nanomaterials	CHEM-03/A	6
Structural Crystallography	CHEM-03/A	6
Omics Sciences	BIOS-07/A	6
Chemistry of materials: from crystal structure to nanostructures	CHEM-04/A	6
Organic Chemistry for Renewable Energies	CHEM-05/A	6
Molecular Recognition	CHEM-05/A	6

Elective courses

2 courses, distributed at the student's choice

Title	SSD	CFU
Struttura e dinamica di macromolecole biologiche**	CHEM-02/A	6
Didattica della Chimica*	CHEM-03/A	6
Chimica dei coloranti organici**	CHEM-05/A	6
Metodologie avanzate per la caratterizzazione dei composti organici *	CHEM-05/A	6
Prodotti e Processi della Chimica Industriale*	CHEM-04/A	6
Metalloenzimi: dalla diagnostica alla sostenibilità**	CHEM-03/A	6
Bionanotecnologie**	BIOS-07/A & CHEM-07/C	6
Glycomics***	CHEM-05/A	6
Metodologie d'indagine per l'ambiente ed i beni culturali **	CHEM-01/B	6
Supramolecular Chemistry***	CHEM-05/A	6
Modeling molecolare e scienza dei dati per la chimica**	CHEM-02/A	6
Biologia strutturale di proteine**	CHEM-03/A	6

*Always in Italian; ** Either in Italian or English; ***Always in English

38 CFU are awarded for the thesis

- **6 CFU for the preliminary phase, at the time of presentation of the project in a seminar**
- **31 CFU for the experimental part**
- **1 CFU for the exam**

The thesis, or part of it, can be carried out at Italian partner universities (Erasmus Italian), foreign (Erasmus / trainesheep) and can lead to the awarding of the Double Master's degree, on the basis of the agreements established by the Course of Study

Enrollment requirements

- ✓ To be admitted, you should hold a **degree in Chemistry or Industrial Chemistry** (L27).

- ✓ If you hold a degree of another class obtained at an Italian university, as well as if you hold another qualification obtained abroad, you can also enroll, provided that **the curricular requirements** detailed in the Regulations of the Course of Study are met (at least 20 credits in the field of mathematics, physics and computer science, and at least 30 credits in the field of chemical disciplines.

- ✓ The adequacy of curricular requirements of **applicants graduated in foreign universities** is assessed on a case-by-case basis, whit the aim of evaluate if the programmes carried out in the different disciplinary areas provide the training bases deemed necessary for the advanced training offered by the study course.

- ✓ Knowledge of the English language is also required: the minimum level is B1 for the curriculum in Italian and B2 for the curriculum in English

Preparation check before enrolment

The verification of personal preparation is mandatory in any case, and only students in possession of curricular requirements can access it

- ✓ For those who are in possession of a class L27 degree, the adequacy of the preparation is considered verified with a mark equal to or higher than 93/110.

- ✓ In the case of a degree in class L27 obtained with a degree grade of less than 93/110, a degree in a different class or a degree obtained abroad, the assessment of adequate personal preparation will be carried out through the analysis of the curriculum which may be followed by a further verification according to the methods, criteria and procedures established by the Teaching Committee and reported on the website of the course of study

There is no limit to the number of students enrolled