UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2025/26
BACHELOR
INDUSTRAL CHEMISTRY (Classe L-27 R)
Enrolled in the academic year 2025-2026

HEADING	
Degree classification - Denomination and code:	L-27 R
Degree title:	Dottore
Length of course:	3 years
Total number of credits required to complete programme:	180
Years of course currently available:	1st
Access procedures:	Open, subject to completion of self-assessment test prior to enrolment
Course code:	FAG

PERSONS/ROLES

Head of Study Programme

Luigi Falciola

Tutors - Faculty

Tutor per l'orientamento in ingresso
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Emma Gallo (Tel. 0250314374; e-mail: emma.gallo@unimi.it)

Degree Course website

https://chimicaindustriale.cdl.unimi.it

Department of chemistry teaching office

Sig. Antonino Nucera, Via Golgi, 19 - 20133 MILANO Phone 02 503 14419 dal lunedì al venerdì ore 10.00-12.00, in altri orari su appuntamento; https://www.unimi.it/it/studiare/servizi-gli-studenti/segreterie-informastudenti

Referring Department Department of Chemistry

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Student administration offices

Via Celoria, 18 - 20133 MILANO https://www.unimi.it/it/studiare/servizi-gli-studenti/segreterie-informastudenti

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

General and Specific Educational Objectives

The primary specific educational objective of the Bachelor's Degree in Industrial Chemistry is to train graduates with the skills and knowledge necessary to perform professional activities in the field of industrial chemical sciences. These include

the development of chemical processes, plant monitoring, and the synthesis and characterization of new materials. The program also aims to provide the cultural tools required to research, develop, and produce within the chemical sector for society, addressing areas such as health, food, cosmetics, environment, energy, communications, furnishings, fashion, and automotive industries.

The training program enables students to acquire the experimental techniques necessary for chemical synthesis and scale-up processes, the determination of chemical and physicochemical properties of matter, analytical methods and computational tools, and methodologies for quality control. Graduates will also be qualified to provide expert advice in applied and industrial chemistry and perform any other activities defined by current legislation related to the profession of Junior Chemist.

Another specific objective of the Bachelor's Degree in Industrial Chemistry is to prepare students for either further advanced studies or immediate entry into professional activities. To this end, the course aims to equip students with a solid understanding of basic scientific methods and content to facilitate an easy transition into the workforce or access to a subsequent Master's Degree program.

In detail, graduates of this program will possess:
- Adequate knowledge of basic mathematical tools for chemical applications, including differential and integral calculus and introductory concepts for handling differential equations.
- Adequate knowledge of classical physics, including mechanics, electromagnetism, optics, and wave propagation.
- Adequate foundational knowledge in informatics, essential for learning chemical disciplines, particularly in understanding and processing experimental data for critical and conscious use of scientific computation software.
- A solid understanding of fundamental chemistry in four main areas (analytical chemistry, physical chemistry, inorganic chemistry, and organic chemistry), covering both essential competencies and more applied and characteristic aspects.
- A good understanding of work procedures applied within industrial chemical processes, including key safety and environmental sustainability criteria.
- Adequate knowledge of basic theories for understanding transport phenomena in chemical process plants and their primary calculation methods.
- The ability to read and interpret technical documents describing industrial chemical processes.
- The capacity to apply innovative methods and techniques and to use complex equipment.

Graduates of this program will possess the knowledge necessary to undertake professional activities, particularly in industrial settings such as chemical plants, research and quality control laboratories, and sectors including new materials production, health, food, environment, and energy. They will apply the disciplinary investigation methods acquired during their studies with autonomy within defined procedures.

Graduates may enroll (after passing the relevant state examination) in the National Order of Chemists and Physicists as Junior Chemists (Section B ? Chemistry) to perform activities recognized by current regulations.

This Bachelor's program incorporates the guidelines of the Italian Chemical Society on basic disciplinary content (Core Chemistry) for Bachelor's Degrees in Class L-27, along with the requirements for "Chemistry Eurobachelor" accreditation by ECTN.

Eurobachelor®
The Bachelor's Degree in Industrial Chemistry at the University of Milan was one of the first in Italy to receive the Eurobachelor Label in December 2009. The Eurobachelor accreditation is awarded by a dedicated commission designated by the European Thematic Association (https://ectn.eu/), which brings together European universities and chemical societies. The Eurobachelor Label qualifies the degree as recognized by other European universities and grants automatic access to Master's Degree programs in chemistry-related fields across Europe.

Expected learning outcomes

By the end of the Bachelor's Degree in Industrial Chemistry, through lectures, laboratory courses, an experimental internship in a research laboratory, and interdisciplinary activities, students will have acquired knowledge and understanding of issues in scientific disciplines, particularly in industrial chemistry and chemical plants. They will demonstrate familiarity with the scientific approach and methodology for solving problems typical of research, development, production, quality control, and regulatory activities.

Additionally, they will have the ability to apply knowledge and understanding thanks to a theoretical education complemented by intensive experimental work in various teaching laboratories. These activities are conducted either individually, to strengthen their "hands-on" skills, or in groups, to improve interaction with others, leadership, and teamwork skills. Graduates will be able to apply their interdisciplinary competencies and advanced abilities to professional challenges directly or indirectly connected to the chemical sector. They will demonstrate the mastery and innovation needed to solve complex and unpredictable problems in their specialized field of work or study.

In terms of independent judgment, students will be capable of planning and conducting experiments by organizing timelines

and operational methods based on available instrumentation. They will interpret scientific data derived from observations and measurements carried out in the laboratory using the techniques acquired, critically evaluate data to identify anomalies and inconsistencies in results, and assess and quantify findings while presenting them through well-crafted scientific reports.

Regarding communication skills, graduates of the Industrial Chemistry program will be able to interact and collaborate with others, communicate ideas, problems, and solutions to both specialized and non-expert audiences in Italian and English, present data through reports and/or presentations using advanced multimedia systems, and acquire, share, and disseminate scientific information using online databases and resources.

Finally, the Bachelor's Degree in Industrial Chemistry aims to foster the development of autonomous thinking and independent study in students. The program promotes the enhancement of learning skills as well as the acquisition of methodological and theoretical abilities, enabling graduates to pursue further studies in Master's Degree programs.

Professional profile and employment opportunities

INDUSTRIAL CHEMIST

Role in a work context:

The industrial chemist designs and develops new products and materials, primarily in industrial settings, and defines production and control criteria. They may work in quality control, environmental monitoring, and waste treatment and disposal processes. They define strategies and procedures for chemical synthesis, transformation, and purification of compounds, techniques for chemical and physical analyses, and the scientific method for investigation and data management.

Graduates in Industrial Chemistry can register with the National Order of Chemists and Physicists as Junior Chemists after passing the specific state exam required for professional qualification.

Skills associated with the role:

The industrial chemist must have a solid understanding of chemistry, industrial chemistry, chemical plant design, and the lifecycle issues of chemical products, from their development to use, recycling, and disposal. They should be able to conduct an LCA (Life Cycle Assessment) of products and have expertise in chemical analysis methods, alongside proficiency with modern IT tools and knowledge of English. Industrial chemists may also perform technical and legal assessments related to plant or environmental damage in litigation cases.

Employment opportunities:

Industrial chemists can find employment in basic chemical industries, fine chemical industries, and research and development laboratories. Other opportunities include public and private research organizations, analysis laboratories, quality control and certification labs, and industries requiring basic knowledge of chemistry and industrial chemistry. In the public sector, industrial chemists may work in local government technical offices, provincial hygiene and health labs, or occupational safety prevention services. Freelancers typically act as consultants for plant design and management, environmental authorization procedures, risk analysis, and legal assignments in courts.

Additionally, graduates in Industrial Chemistry can pursue advanced studies in scientific master's degree programs, particularly in Chemistry-related classes (LM71 and LM54) and other related disciplines.

R&D SPECIALIST IN PRODUCTS, PROCESSES, AND FORMULATIONS

Role in a work context:

In this position, the industrial chemist synthesizes new industrial products for various applications and oversees their production in companies, ensuring the testing and control of production, purification, and pollution reduction plants, as well as guaranteeing safety. They conduct laboratory tests for developing new processes and formulations and improving existing ones, ensuring that products, processes, and formulations comply with current regulations and safety standards.

Skills associated with the role:

Graduates must possess not only a sound knowledge of chemistry, industrial chemistry, and plant design but also the rigor to strictly apply the scientific method. They need a fundamental understanding of scale-up challenges and safety regulations, as well as relevant legislation.

Employment opportunities:

This professional figure can find employment in chemical and petrochemical companies, as well as in cosmetics, food, plastics, dyes, detergents, adhesives, and environmental sectors.

PRODUCTION PLANT MANAGEMENT AND OPERATION SPECIALIST

Role in a work context:

This professional oversees plant operations in compliance with safety and environmental standards, according to production plans and market demands. They ensure the safety of operations and collaborate on solutions for continuous improvements in reliability and energy efficiency. Additionally, they ensure customer supply in terms of quality, adherence to specifications, and safety.

Skills associated with the role:

Graduates must have a thorough knowledge of industrial chemistry and plant design. This profession also requires a fundamental understanding of scale-up challenges and relevant safety and legal regulations. Proficiency in modern IT technologies and English is also essential.

Employment opportunities:
Graduates can work in research and development, production, and logistics in chemical, petrochemical, mechanical, plastics, dye, detergent, and adhesive companies. Employment opportunities are also available in public and private research organizations, quality control laboratories, and workplaces requiring fundamental knowledge of chemistry and industrial chemistry.

SCIENTIFIC INFORMANT AND COMMUNICATOR
Role in a work context:
This graduate increases scientific knowledge in their field and transfers this knowledge to industries, medicine, pharmacology, and other production sectors. They inform industry professionals about the features and properties of their company?s products. The role involves promoting the adoption of specific products and conducting scientific information activities for companies to ensure their proper use. The profession of pharmaceutical sales representatives is regulated by national laws.

Skills associated with the role:
The necessary skills for scientific informants include scientific knowledge and commercial skills. Specifically, they need a solid foundation in chemistry, familiarity with pharmaceutical, cosmetic, and food products, and knowledge of their proper use. Technical English proficiency, IT knowledge, communication skills, and initiative complete this professional profile.

Employment opportunities:
Scientific informants work for cosmetic, pharmaceutical, food, plastics, dye, detergent, adhesive, and environmental companies or in general for chemical sector companies and/or specialized magazines.

Initial knowledge required

Requirements and Knowledge Needed for Admission
To be admitted to the Bachelor's Degree in Industrial Chemistry, candidates must hold a high school diploma or an equivalent qualification obtained abroad, recognized as valid, as well as demonstrate an adequate initial preparation. The degree program has an open-access policy.
The required knowledge includes: basic knowledge of mathematics and scientific disciplines, as well as the ability to perform simple logical deductions and text comprehension, at a level equivalent to that achieved in secondary school education.
Verification of Knowledge and Personal Preparation
The degree course in Industrial Chemistry is open access.
Admission to the degree course requires a mandatory, but non-selective, test to be carried out before enrolment, aimed at ascertaining the students' initial preparation in terms of minimum knowledge requirements of basic scientific disciplines. The non-selective access test involves taking the TOLC test (CISIA Online Test), which can be taken at the University of Milan or at any other university participating in CISIA (Interuniversity Consortium for Integrated Systems for Access).
Registrations 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, of which it is possible to consult the structure and topics of the test, as well as other useful information, on the page https://www.cisiaonline.it/area -thematic-tolc-sciences/structure-of-the-test-and-syllabus/
The outcome of the English section does not replace the assessment of 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, having taken the mandatory (but not selective) TOLC-S intend to use it to access the Degree course in Industrial Chemistry at the University of Milan MUST register on the CdS website to proceed with enrollment within the deadlines indicated in the announcement .
Students who have taken the mandatory (non-selective) TOLC-S and wish to use it for admission to the Industrial Chemistry program at the University of Milan MUST register on the program's website to proceed with enrollment within the deadlines specified in the announcement.
For more details on the announcement, deadlines, and admission/enrollment procedures, please refer to:
https://www.unimi.it/it/studiare/frequentare-un-corso-di-laurea/iscriversi/iscriversi-una-prima-laurea

Access by transfer or for students who have already graduated
Students already enrolled in a degree program at the University of Milan, another university, or those who have already graduated may be exempt from the admission test only if they meet the requirements for admission to years following the first in the edition of the degree program reserved for students enrolled up to the 2024-2025 academic year. Specifically, they must have at least 30 ECTS credits related to first-year courses, including at least 9 credits that can be validated for the Institutions of Mathematics exam.
To this end, applicants must submit a specific request for a preliminary career evaluation by accessing the online service

indicated in the admission call. Applicants must declare all exams taken, including their subject areas, credits, and grades, and attach the course syllabi. For further details on the procedure, please refer to the admission call.
The application will be reviewed by the Degree Program's Transfer Committee. If the applicant is not eligible for admission to years beyond the first, they will be required to take the initial knowledge assessment test.
Requests for evaluation, along with the syllabi of the completed exams, must be submitted strictly by the deadline published in the admission call, and the evaluation outcome will be communicated via email.
Students admitted to years following the first must complete enrollment within the deadlines and according to the procedures specified in the admission call.
Students admitted to the first year must take the initial knowledge assessment test and submit an admission application as indicated in the admission call.
Similarly, to expedite the administrative process, all requests for exam equivalency and/or recognition of prior academic careers must include the syllabi of the completed exams..

Additional Learning Obligations (OFA) and Recovery Modalities
Students who do not achieve a score of 10 or higher in the Basic Mathematics section of the TOLC-S will be assigned Additional Learning Obligations (OFA).
For students with OFA, support activities will be organized between October and December, followed by a recovery test (to be completed by January of the year following enrollment). This test is designed to demonstrate improved preparation.
If the student fails to provide such evidence, they will not be allowed to take any second-year exams until they pass the Mathematics Institutions exam.

Compulsory attendance
Attendance at laboratory activities is mandatory, in all other cases it is strongly recommended.

Internship criteria
Towards the end of the course of study, a compulsory training internship (9 credits) is expected to be carried out according to the methods indicated below. The internship activity is divided into:
- *Internal internship*: consisting of an activity in the chemical field 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;

- *External internship*: consisting of an activity in the chemical field carried out by the student in the Departments linked to other Faculties of the University of Milan, or in public or private organizations or companies, under the guidance of a Manager (Company Tutor) and the supervision of an internal supervisor.

To start the internship the student must have obtained at least 128 credits.
The submission of the application for entry into the internship can take place up to the 1st day of each month for entry into the internship - unless approved by the Teaching Committee - to 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 website https://chimica.cdl.unimi.it/it/studiare/stage-e-tirocini
In the case of external internships at organizations or companies, students must contact the Thesis and Internships Commission in good time (paola.fermo@unimi.it) to start the authorization procedure. In this regard, please consult the specific regulation, which can be found on the CdS website.
Students who are admitted to carry out the internship under the Erasmus project must submit an application before leaving for the destination university. In this case, the CFU requirement is waived as long as the students have achieved, upon return, 128 CFU through exams taken abroad. Otherwise, the internship will not be valid for the purposes of obtaining the qualification. For further information, you can contact the Internationalization and Erasmus Commission (emma.gallo@unimi.it).

The Supervisor is the guarantor towards the Teaching Committee of the activity assigned to the student during his internship and of its correct execution. All professors and researchers who carry out teaching activities of a chemical nature, belonging to the Teaching College or the Department of Chemistry or belonging to the Departments linked to the Faculty of Science and Technology, can be Speakers. The Rapporteur may be assisted by a Co-Supervisor. In addition to all the teachers included in the category of Official Speakers, the following can be Internship Co-Supervisors:
the official teachers of other universities and polytechnics, including foreign ones;
graduates declared experts in the subject;
employees of the University of Milan, classified as non-teaching staff with a level equal to or higher than D and declared experts in the subject;
the C.N.R. researchers who operate within the Department of Chemistry;
the experts designated by the structures hosting the external internships.
Special cases may be taken into consideration by the CD, if people of particular scientific-technical importance are involved. In this case, the Supervisor must briefly document in writing the specific expertise of the proposed Co-Supervisor on the topic of the thesis research.
In the case of an external internship, in addition to the internal supervisor, there is an external supervisor (company tutor) who is the educational-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 for approval by the Teaching Committee.

Degree programme final exams

To obtain the degree the student must have acquired 180 credits. The final test consists in the discussion before a special Commission of a written report drawn up by the student independently, under the guidance of a supervisor, relating to the activity carried out in the training internship. This paper must describe the activity carried out by the student in research groups or companies during the internship, and must document the fundamental aspects of the activity carried out in relation to the current state of knowledge in the chemistry sector.
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 approval of the internship, for a total of 177 ECTS.

SESSIONS FOR DEGREE EXAMS
July 2026
October 2026
December 2026
February 2027
April 2027

Notes

In order to obtain the degree, students are required to have at least a B1 level proficiency in English, according to the Common European Framework of Reference for Languages (CEFR). This level can be certified in the following ways:

- By submitting a language certification obtained no more than three years prior to the submission date, at B1 level or higher (for the list of language certifications recognized by the University, please refer to: https://www.unimi.it/en/study/language-proficiency/placement-tests-entry-tests-and-english-courses). The certification must be uploaded at the time of enrollment or later through the portal http://studente.unimi.it/uploadCertificazioniLingue.

- By taking the Placement Test, administered by the University Language Center - SLAM, exclusively during the first year, from October to December. If the test is not passed, students will be required to attend the courses provided by SLAM.

The Placement Test is mandatory for all students who do not hold a valid language certification. Those who do not take the Placement Test by December or fail the final course test within six attempts must obtain a certification independently before graduation.

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 organisations.

Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

The University of Milan is a member of the 4EU+ European University Alliance that brings together eight public multidisciplinary universities: University of Milan, Charles University of Prague, Heidelberg University, Paris-Panthéon-Assas University, Sorbonne University of Paris, University of Copenhagen, University of Geneva, and University of Warsaw. The 4EU+ Alliance offers integrated educational pathways and programmes to promote the international mobility of students (physical, blended and virtual).

Study and internships abroad

As part of the study plan, students can participate in the Erasmus program projects activated for the Degree Course. In particular, within the Erasmus + programme, students can choose between 16 associated European universities. At these locations, students can obtain training credits by following courses and passing the relevant exams, or by carrying out part or all of the final internship. The acquisition of training credits is subject to approval by the Teaching Committee of a specific study plan (Learning Agreement) and the passing of exams at the foreign institution.
Interested students are asked to make an appointment in advance with the Tutor for international mobility and Erasmus (prof. Emma Gallo, Tel. 0250314374; e-mail: emma.gallo@unimi.it) for the preparation of the procedures. Students can also participate in numerous seminar meetings with foreign teachers.

How to participate in Erasmus mobility programs

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 organises 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;
Student Desk booking through InformaStudenti

1st COURSE YEAR Core/compulsory courses/activities common

Learning activity	Ects	Sector
Analytical Chemistry: Fundamentals and Electroanalysis/Analytical Chemistry Laboratory: Fundamentals and Electroanalysis	12	CHIM/01
Complements of mathematics and numerical analysis	6	MAT/08
English assessment B1 (3 ECTS)	3	ND
General and inorganic chemistry/General and inorganic chemistry laboratory	12	CHIM/03
Mathematics	12	MAT/02
Organic chemistry I	8	CHIM/06
Physics	9	FIS/03
Total compulsory credits	62	

2nd COURSE YEAR (available as of academic year 2026/27) Core/compulsory courses/activities common

Learning activity	Ects	Sector
Advanced physical chemistry	6	CHIM/02
Chemical analysis with lab: spectroscopic and chromatographic techniques	12	CHIM/01
Chemical kinetics with laboratory	6	CHIM/02
Chemical thermodynamics	6	CHIM/02
Inorganic chemistry/Inorganic chemistry laboratory	12	CHIM/03
Organic chemistry II	7	CHIM/06
Organic synthesis laboratory	9	CHIM/06
Total compulsory credits	58	

3rd COURSE YEAR (available as of academic year 2027/28) Core/compulsory courses/activities common

Learning activity	Ects	Sector
Biomolecules and fundamentals of biochemistry	6	BIO/10
Chemical plants/Chemical plants laboratory	12	ING-IND/25
Fundamentals of industrial chemistry	6	CHIM/04
Fundamentals of polymer science with laboratory	6	CHIM/04
Industrial physical chemistry	6	CHIM/02
Total compulsory credits	36	

Elective courses

In the third year of the course, students must acquire 12 ECTS by freely choosing among all the activities and courses activated by the University that are functional to the training path of the LT in Industrial Chemistry. Students are advised to take advantage of this list of 6 ECTS courses designed specifically for the degree course.			
Analysis applied to sustainable processes and industrial products		6	CHIM/01
Industrial surface treatment technologies		6	CHIM/02
Instruments for measurement and control in chemical plants		6	CHIM/04
Methods and technologies for organic synthesis		6	CHIM/06
Technologies for biomass valorisation		6	CHIM/03
End of course requirements			
Analysis applied to sustainable processes and industrial products		3	ND
Stage		9	ND
	Total compulsory credits	12	

COURSE PROGRESSION REQUIREMENTS

- The "Mathematics Institutions" and "General and Inorganic Chemistry / General and Inorganic Chemistry Laboratory" exams must be taken before the 2nd year and 3rd year exams.
- The "General Physics" and "Complements of mathematics and numerical calculation" exams must be taken before the 3rd year exams.
- The "Chemical analysis: fundamentals and electroanalysis with laboratory" exam must be taken before the "Chemical analysis: spectroscopic and chromatographic techniques with laboratory" exam.
- The "Chemical Thermodynamics" exam must be taken before the "In-depth study of physical chemistry" exam.
- The “Chemical Thermodynamics” and “Chemical Kinetics with laboratory” exams must be taken before the “Industrial Physical Chemistry” exam.
- The "Organic Chemistry I" exam must be taken before those of "Organic Chemistry II", "Organic Synthesis Laboratory", "Biomolecules and fundamentals of biochemistry", "Fundamentals of polymer science with laboratory".

However, it is advisable to take the exams of each semester before taking those of the following semesters.

Learning activity	**Prescribed foundation courses**	**O/S**
Chemical analysis with lab: spectroscopic and chromatographic techniques	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Analytical Chemistry: Fundamentals and Electroanalysis/Analytical Chemistry Laboratory: Fundamentals and Electroanalysis	Core/compulsory
Chemical thermodynamics	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
Advanced physical chemistry	Chemical thermodynamics	Core/compulsory
	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
Chemical kinetics with laboratory	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
Biomolecules and fundamentals of biochemistry	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Physics	Core/compulsory
	Organic chemistry I	Core/compulsory
	Complements of mathematics and numerical analysis	Core/compulsory
Industrial physical chemistry	Chemical thermodynamics	Core/compulsory
	Chemical kinetics with laboratory	Core/compulsory
	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Physics	Core/compulsory
	Complements of mathematics and numerical analysis	Core/compulsory
Fundamentals of industrial chemistry	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Physics	Core/compulsory
	Complements of mathematics and numerical analysis	Core/compulsory
Fundamentals of polymer science with laboratory	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Physics	Core/compulsory
	Organic chemistry I	Core/compulsory
	Complements of mathematics and numerical analysis	Core/compulsory
Chemical plants/Chemical plants laboratory	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Physics	Core/compulsory
	Complements of mathematics and numerical analysis	Core/compulsory
Inorganic chemistry/Inorganic chemistry laboratory	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory

	Mathematics	Core/compulsory
Organic chemistry II	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Organic chemistry I	Core/compulsory
Organic synthesis laboratory	General and inorganic chemistry/General and inorganic chemistry laboratory	Core/compulsory
	Mathematics	Core/compulsory
	Organic chemistry I	Core/compulsory