



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2024/25
BACHELOR
Herbal Sciences and Technologies (Classe L-29)
enrolled from 2014/15 academic year

HEADING

Degree classification - Denomination and code:	L-29 Pharmacy
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:	K04

PERSONS/ROLES

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(N-Z) Alessandra Romanelli 02 503 14475

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Degree Course website

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

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Pharmacy course management

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<https://informastudenti.unimi.it/saw/ess?AUTH=SAML>

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Student registrar

Sedi e orari: <https://www.unimi.it/it/node/360> Phone 02 50325032 <https://www.unimi.it/it/node/359>

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

Graduates in Herbal Sciences and Technologies will have mastered the methods of investigation and experimentation, including data collection and communication of results, and will be able to understand and use advanced texts. They will have operational skills and will be able to carry out technical, managerial and professional tasks in the recognition and collection of medicinal plants and their transformation, in quality management, in the marketing of herbal drugs and their derivatives to be used in the preparation of medicinal products, health products, cosmetics or intended for food, ensuring compliance with the provisions of national and EU laws in force.

Expected learning outcomes

In respect of European principles, outgoing skills, in terms of expected learning outcomes, developed by graduates in Degree Course meet the specific requirements identified by the National Conference of the Presidents of undergraduate courses in Herbal Sciences and Technologies (CONPTER) for class L-29. In particular, according to the system of descriptors of Dublin:

1. Knowledge and skills of understanding post-secondary textbooks and scientific articles, avant-garde included, and international literature on the specific processes concerning transformation of plants and their derivatives; the recognition of herbal drugs, phytochemistry; analyses and dosage of the active ingredients; the biological effects of medicinal plants; the toxicological aspects of the use of active ingredients and finished products; the detection of adulteration and contamination; the quality assurance of products based on medicinal plants and derivatives ; the possible applications of plants and their derivatives for health products, including food and cosmetics;
2. Ability to apply the multidisciplinary knowledge and skills acquired both for designing and supporting arguments to resolve issues concerning the recognition, collection and conservation of medicinal plants, storage, control, distribution and supply of herbs and their derivatives; analysis and determination of active ingredients; knowledge of the biological effects of medicinal plants; knowledge of toxicological aspects of the use of active ingredients and their finished products; the study, design, direction, monitoring, conduction of productive processes of plants and their derivatives; recognition of herbal drugs, the detection of adulteration and contamination; the quality control of products based on medicinal plants and derivatives; the possible applications of plants and their derivatives for health products, including food and cosmetics; marketing at wholesale and retail of medicinal plants and their derivatives; knowledge of the law and ethical rules in the sector, the technical - inherent scientific supervision of medicinal plants and their derivatives at the Department of the Government, particularly in the Ministries of Health, of Agriculture, Food and Forestry, Trade and Handicraft and Finance
3. Autonomy of judgement to collect and to interpret data deemed useful for the resolution of even complex issues in the fields of competence, including reflection on social, scientific and ethical issues related to the use of medicinal plants in different sectors;
4. Ability to communicate information, ideas, problems and solutions in the field of medicinal plants and their derivatives to specialist and non-specialist interlocutors, including technical scientific advisory to publishing companies in the herbal sector.
5. Capacity of learning by consulting bibliographic databases and other network information, including English, for a continuous updating of knowledge concerning the biological effects of medicinal plants, phytochemistry, recognition of drug plants, analyses and dosage of the active ingredients, toxicological aspects, the processes of plants and their derivatives, quality management of products based on medicinal plants and derivatives, the detection of adulteration and contamination, the possible applications of officinal plants and their derivatives as products for health, including food and cosmetics.

Professional profile and employment opportunities

The Bachelor's degree course in Herbal Sciences and Technologies prepares for the profession of:

- Herbal technician capable of operating in work contexts related to the cultivation, production, processing, quality control, commercialization, and use of medicinal plants, food plants of health interest, and their derivatives;
- Chemical technicians capable of assisting specialists in the analysis of solid, liquid, and gaseous materials conducted in the field of chemical research and in the quality control of production, to control and maintain quality standards;
- Technicians in popular medicine.

Graduates have the right to enrol in the National Herbalists Register managed by the Federation of Italian Herbalists (FEI). The degree is one of the requirements needed for the access to the National Examination (Esame di Stato) for registration in Section B of the Professional Register of Chemists, allowing them to practice as junior chemists.

Graduates in Herbal Sciences and Technologies receive preparation that allows them to work as freelancers or employees in:

- Herbal shops;
- Pharmacies and parapharmacies (as head of the herbal and phyto-cosmetic department); points of sale of health products based on plant products and dietary supplements;
- Companies specialized in the production, processing, and extraction of medicinal and aromatic plants; food and cosmetic industries where natural products of plant origin are used
- Companies responsible for the wholesale and/or retail marketing of medicinal plants and their derivatives;
- Laboratories, institutions, or bodies responsible for quality certification;
- Laboratories, institutions, or bodies responsible for quality certification of products containing plant derivatives;
- Sectors for the promotion and advertising of products based on medicinal and aromatic plants;
- National Health Service structures (ASL, hospitals).

In addition, the graduate can also perform:

- Scientific information activities on behalf of producing companies in the sector
- Consulting activities at herbal laboratories and production or marketing companies.

Initial knowledge required

Admission requirements

To be admitted to the Bachelor's degree program in Herbal Sciences and Technologies, applicants must have a high school diploma or an equivalent qualification obtained abroad, recognized as suitable, and adequate preparation in basic subjects.

To successfully attend the degree program, it is necessary to have acquired knowledge that includes a satisfactory familiarity with basic mathematical calculations and computer science, mastery of the main laws of physics, and basic knowledge of cell biology and general chemistry.

For admission to the program, a merit ranking will be formulated based on the grade obtained in the final exam of the high school. In case of a tie, the best grade obtained in mathematics in the admission review for the high school diploma will prevail, and in case of further ties, the best grade obtained in Italian in the admission review for the high school diploma will prevail.

More details will be communicated through the annual call for applications.

Students enrolled who have obtained a grade lower than 7 in mathematics in the high school diploma examination will be assigned additional training obligations (OFA) that must be recovered during the first year with the methods specified below.

Additional training obligations (OFA) and remedial activities

The additional training obligations can be fulfilled by attending support activities organized by the University, followed by a recovery test with which the student must demonstrate that they have improved their preparation. In the absence of this evidence, the student will not be able to take the Mathematics and Informatics exam. Further information is available on the page <https://ste.cdl.unimi.it/it/studiare/le-matricole>

Access for transfer or for already graduated students

Students already enrolled in a degree program at the University of Milan, at another university, or already graduated may waived from the selection process only if admitted to years subsequent to the first. To this end, a specific request for a prior assessment of their academic career must be submitted by accessing the online service stated in the call for applications. Applicants must declare provide a full transcript of records taken with their subject areas, credits, and grades and attach the course syllabi. For more details on the procedure, please refer to the call for applications.

Students admitted to the first year will be selected based on the high school diploma grade and must register for the call.

Compulsory attendance

Attendance is mandatory for single-seat laboratory exercises.

Internship criteria

Training program includes a mandatory internship which allow student to acquire 12 University credits through a period of stage done at University institutions or at private corporations outside the Departments, according to an agreement handled by COSP. It is advisable to start internship during the third year when the student acquires a solid preparation.

Degree programme final exams

During final exam, which is a moment of individual training to the completion of the training, the student shows and discusses a final paper which can be focused on his internship activities, when done in a research lab or in a company, or on a review of a compiling literature about a specific topic under the guidance of a supervisor. The final exam can be taken in English and final paper may be submitted in the same language.

Below is a detailed description of the different types of theses available:

EXPERIMENTAL THESIS: experimental works are those carried out by the student under the guidance of a supervisor to articulate and show a hypothesis through an original dissertation on a specific topic.

COMPILING THESIS: the compilation thesis consists in analysing a specific topic by consulting literature which is shown in an original dissertation based on comparison and evaluation of different sources consulted.

SEMI-EXPERIMENTAL THESIS: it can be considered a semi-experimental thesis the one which deals with a specific topic on the basis of literature analysis and supported by a real research activity without the relevance required for an experimental

thesis due to less originality and / or less completeness.

Before sitting the final exam, upcoming graduates must have earned 177 CFU, as established in Academic Regulation.

Campus

Lectures take place in classrooms as indicated in classes timetable.

Laboratories

Single-seat laboratory exercises take place in labs available to the Faculty of Pharmacy, according to the classes timetable. Each laboratory location is equipped with a workstation set up for students with motor disability.

Notes

For-credit assessment B1

In order to obtain their degree, students must be proficient in English at a B1 level under the Common European Framework of Reference for Languages (CEFR). This proficiency level may be certified as follows:

- By submitting a language certificate attesting B1 or higher level in English and issued no more than three years before the date of submission. You will find the list of language certificates recognized by the University at: <https://www.unimi.it/en/node/39322>). The certificate must be uploaded during the enrolment procedure, or subsequently to the portal <http://studente.unimi.it/uploadCertificazioniLingue>;

- By taking a placement test offered by the University Language Centre (SLAM) between October and December of the first year. Students who fail the test will be required to take a SLAM course.

The placement test is mandatory for all those who do not hold a valid certificate attesting to B1 or higher level.

Those who have not taken the placement test by the end of December or fail the end-of-course exam six times must obtain the necessary certification privately before graduating.

Computer skills

Students who are supposed to earn 3 credits (CFU) for basic computer skills, as provided by their degree programme, have to attend the Computer Science Course through the e-learning platform of the project called 3CFU Informatica accessible at the following link: <https://3cfuinformatica.unimi.it>

It is a blended course with a compulsory final exam.

The first exam session is scheduled for January, and more will follow according to a calendar to be made available on the course delivery platform.

Students who have already fulfilled an ICT Assessment during their previous studies should submit the related certification to their degree Academic Board, seeking its acknowledgement: it will be evaluated and they will receive a positive or negative feedback.

The Computer Science Course 3CFU course is managed by the CTU - Teaching and Learning Innovation and Multimedia Technology Centre.

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

The Bachelor's school in Herbal Sciences and Technologies offers to its students the opportunity to spend periods of study and training abroad through mobility programs mainly represented by Erasmus+. The geographical areas in which reside the European Universities partners of the international training program are mainly located in the European Union countries. Students may also apply for the destinations specified in the call of Agricultural Sciences and Technologies. Mobility is directed to the study (frequency to courses) and to a training period that may be the subject of the thesis. Universities with which Agreements were established offer courses and training periods in pharmacology, phytochemistry, microbiology and pathology. Each student is assisted by one of the teacher of the course as an internal tutor.

Recognition of study periods abroad:

Each student, depending on the period of time spent abroad, should propose a Learning Agreement providing an adequate number of credits for his/her study or training:

- An academic year: 60 credits;
- An academic semester: 30 credits;
- An academic quarter: 20 CFU

For study programs, students must acquire at least 70% of the credits specified in the Learning Agreement. For the training period the student must acquire all the credits specified by the Learning Agreement. Additional score to the degree mark will be added to students who have fulfilled the study or training programs. This score ranges from a minimum of 1 to a

maximum of 3 points (depending on the duration of the training period, the amount of credits obtained and the overall result achieved) and will be proposed by the tutor to the Commission of the final exam.

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 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 2024/25) Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Biology	6	BIO/13
Chemical Toxicology Analysis	7	CHIM/08
English assessment B1 (3 ECTS)	3	NN
General and Inorganic Chemistry	6	CHIM/03
Human physiology and basic anatomy	9	BIO/09
Mathematics and Informatics	7	MAT/09, MAT/01, MAT/02, MAT/03, INF/01, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
Organic Chemistry	7	CHIM/06
Plant Biology and Pharmaceutical botany	12	BIO/15
Total compulsory credits		57
2nd COURSE YEAR Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Agricultural biochemistry and physiology of medicinal plants	6	AGR/13
Biochemistry and Human nutrition	12	(7) BIO/10, (5) BIO/09
Chemistry of natural organic compounds and foods	11	(6) CHIM/10, (5) CHIM/06
General Pathology and Pathophysiology	6	MED/04
PHARMACOGNOSY 1	6	BIO/15
Pharmacology and Toxicology	10	BIO/14
Phytopharmaceuticals: Chemistry and Analysis	8	CHIM/08
Total compulsory credits		59
3rd COURSE YEAR Core/compulsory courses/activities common		

Learning activity	Ects	Sector
Advanced analysis of active principles in herbal drugs	8	CHIM/08
Experimental models and use of herbal drugs	11	(5) BIO/15, (6) BIO/14
FORMULATION AND LEGISLATION OF COSMETIC PRODUCTS	6	CHIM/09
FORMULATION AND LEGISLATION OF HEALTH PRODUCTS	6	CHIM/09
PHARMACOGNOSY 2	6	BIO/15
	Total compulsory credits	37

Elective courses

To ensure adequate flexibility in the educational path, during the third year, students acquire 12 CFU (university credits) through elective activities, upon presentation of an individual study plan via the online platform. To obtain these CFUs, students have three different options:

- a) Elective courses worth 3 CFUs, specifically activated and included in the dedicated list proposed annually in the Study Programme Description; b) Recognition of exams passed in any previous academic careers; c) Free choice among all the courses offered by the University for Bachelor's degrees, provided that the prerequisites are met. Mixed options are also possible.

In cases a) and b), the study plan is automatically considered approved. In case c), the study plan must be approved by the Interdepartmental Academic Board, which verifies the actual coherence of the choices with the overall educational path.

RECOGNITION OF CREDITS OBTAINED ABROAD

Among the creditable educational activities, there is also the possibility to recognize up to a maximum of 6 CFUs for internships/trainings carried out within the Erasmus framework or through other mobility programs recognized by the Faculty of Pharmacy, which exceed the 12 CFUs of internships indicated in the study plan of Herbal Sciences and Technologies. Students who undertake a 6-month mobility for trainings/internships/experimental internships are entitled, in case of positive evaluation, to the recognition of 18 CFUs to be included in their study plan. For the procedures of recognition of such credits, students are advised to contact the Erasmus Coordinator of the Faculty of Pharmacy.

Active molecules from natural sources as Pharmacological Tools	3	BIO/14
Aromatic and Medicinal Plant Cultivation	3	AGR/04
Dietary products	3	CHIM/10
Ethnobotany	3	BIO/15
Ethnopharmacology	3	BIO/14
Fermentation chemistry	3	CHIM/11
Medicinal plants and their recognition	3	BIO/15
Natural antioxidants, vitamins and phytosterols	3	BIO/14
Pharmaceutical Development of Active Ingredients of Herbal Drugs	3	CHIM/08
Physiology of the skin	3	BIO/09
Phytotherapy for the skin	3	BIO/14
Poisonous plants and allergens	3	BIO/14
PRINCIPLES OF DIETETICS	3	BIO/09

End of course requirements

FINAL EXAM	3	NN
Practical training	12	NN
	Total compulsory credits	15

COURSE PROGRESSION REQUIREMENTS

COMPULSORY ATTENDANCE AND REQUIREMENT FOR ADMISSION TO THE EXAMINATIONS

Attendance at the General and Inorganic Chemistry course is compulsory, therefore students attending at least 75% of the lessons will be able to access the exam. In any case, personalized paths are provided for working students.

Since it is important that the students' training develops in an orderly manner, the preparatory courses have been established as detailed in the table below. Mandatory ones are binding. The recommended ones help the student to pass the exam more easily.

RULES FOR ACCESS TO THE SINGLE PLACE EXERCISES

Some courses provide credits after the compulsory frequency to some single place laboratories and will lead to registration of frequency signature. These laboratories are rationally distributed over the three years of study and have a progressive degree of complexity. Access rules have therefore been established as listed below:

1. Access to the laboratory of the Chemistry of natural organic substances which is the module of the integrated course of Chemistry of natural organic substances and food chemistry is subject to passing the general and inorganic chemistry exam.
2. Access to the laboratory of Phytopharmaceutical chemistry and analysis is subject to the signing of frequency of Chemical and toxicological analysis laboratory and overcome exams of general and inorganic chemistry and organic chemistry.
3. Access to Advanced analysis of active principles of vegetable drugs, is conditional on the acquisition of signature frequency of Phytopharmaceutical chemistry and analysis laboratory and passing Organic Chemistry.
4. Access to the laboratory of Formulation and Legislation of cosmetic products is subject to the acquisition of attendance signature of the laboratory of Formulation and Legislation of health products.

Learning activity	Prescribed foundation courses	O/S
Pharmacology and Toxicology	General and Inorganic Chemistry	Core/compulsory

	Biology	Core/compulsory
	Human physiology and basic anatomy	Core/compulsory
	Organic Chemistry	Core/compulsory
Advanced analysis of active principles in herbal drugs	General and Inorganic Chemistry	Core/compulsory
	Chemical Toxicology Analysis	Core/compulsory
	Organic Chemistry	Core/compulsory
	Phytopharmaceuticals: Chemistry and Analysis	Core/compulsory
Experimental models and use of herbal drugs	General and Inorganic Chemistry	Core/compulsory
	Pharmacology and Toxicology	Core/compulsory
	General Pathology and Pathophysiology	Core/compulsory
	Biochemistry and Human nutrition	Core/compulsory
	Plant Biology and Pharmaceutical botany	Core/compulsory
	Biology	Core/compulsory
	Human physiology and basic anatomy	Core/compulsory
	Organic Chemistry	Core/compulsory
FORMULATION AND LEGISLATION OF COSMETIC PRODUCTS	General and Inorganic Chemistry	Core/compulsory
	Chemical Toxicology Analysis	Core/compulsory
	Plant Biology and Pharmaceutical botany	Core/compulsory
	Organic Chemistry	Core/compulsory
	Phytopharmaceuticals: Chemistry and Analysis	Core/compulsory
	PHARMACOGNOSY 1	Core/compulsory
FORMULATION AND LEGISLATION OF HEALTH PRODUCTS	General and Inorganic Chemistry	Core/compulsory
	Chemical Toxicology Analysis	Core/compulsory
	Plant Biology and Pharmaceutical botany	Core/compulsory
	Organic Chemistry	Core/compulsory
	Mathematics and Informatics	Core/compulsory
	Phytopharmaceuticals: Chemistry and Analysis	Core/compulsory
	PHARMACOGNOSY 1	Core/compulsory
Agricultural biochemistry and physiology of medicinal plants	General and Inorganic Chemistry	Core/compulsory
	Plant Biology and Pharmaceutical botany	Core/compulsory
	Organic Chemistry	Core/compulsory
General Pathology and Pathophysiology	Human physiology and basic anatomy	Core/compulsory
Biochemistry and Human nutrition	General and Inorganic Chemistry	Core/compulsory
	Biology	Core/compulsory
	Human physiology and basic anatomy	Core/compulsory
	Organic Chemistry	Core/compulsory
Chemistry of natural organic compounds and foods	General and Inorganic Chemistry	Core/compulsory
	Organic Chemistry	Core/compulsory
Phytopharmaceuticals: Chemistry and Analysis	General and Inorganic Chemistry	Core/compulsory
	Chemical Toxicology Analysis	Core/compulsory
	Organic Chemistry	Core/compulsory
PHARMACOGNOSY 1	Plant Biology and Pharmaceutical botany	Core/compulsory
PHARMACOGNOSY 2	Pharmacology and Toxicology	Core/compulsory
	Plant Biology and Pharmaceutical botany	Core/compulsory
	PHARMACOGNOSY 1	Core/compulsory