



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2025/26
BACHELOR
NATURAL HEALT PRODUCTS SCIENCES (Classe L-29)
Enrolled in 2024/25 academic year

HEADING

Degree classification - Denomination and code:	L-29 Pharmacy
Degree title:	Dottore
Curricula currently available:	
Length of course:	3 years
Total number of credits required to complete programme:	180
Years of course currently available:	2nd
Access procedures:	Open, subject to completion of self-assessment test prior to enrolment
Course code:	E19

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Student Desks

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CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The degree course in Natural Health Products Sciences (CdS) aims to prepare graduates with both basic and applied knowledge, as well as professional skills in the field of natural health products sciences, providing the necessary foundation for access to master's degrees, specialization courses and masters in the relevant cultural area.

The CdS aims to provide a set of theoretical and practical knowledge in the fields of botany, chemistry, biology, chemical-pharmaceutical, pharmaco-toxicological, pharmacognostic, technological and legislative sciences, allowing graduates to address the entire sequence of the complex multidisciplinary process that leads to the development, production, commercialization, correct use and control of raw materials and finished products, with specific reference to natural products for health, in accordance with current regulations.

Graduates of the CdS will have basic knowledge, able to use them in their applicative aspects. They know the methods of investigation proper to the sector and can use the results of experimentation for professional purposes, as well as to finalize their knowledge to the solution of sectoral problems and have competence in the use of advanced texts. The graduate has operational skills and can perform technical, management and professional tasks in the transformation of medicinal plants, quality management and marketing of natural health products, to be used in the preparation of health products, cosmetics or intended for food, ensuring compliance with current national and community laws. He/she can acquire necessary information and evaluate their implications in a production and market context, to implement interventions to improve the quality of natural health products. In addition, he/she is able to communicate effectively orally and in writing on topics related to his/her field of competence. Finally, he/she has the basic tools for continuous updating of knowledge, also using new communication technologies.

Thanks to the multidisciplinary knowledge acquired, the graduate can enter the following professional sectors:

- in herbalist's shops, parapharmacies and pharmacies with herbalist's department to devote themselves to temporary preparations, packaging, retail sale of herbal products;
- in the industrial field, where they can hold roles involved in the design/production/commercialization of raw materials and finished products, in the field of natural health products, their packaging, on sale and on the control of quality and safety;
- in public and private laboratories where the quality of products on the market is verified, even following importation from foreign countries, and where they can prepare technical regulations and certify the quality of products;
- in associations or regulatory bodies of the sector, both national and international, where they can perform coordination functions between different disciplinary areas/work contexts.

The skills necessary to perform the activities previously described are acquired through theoretical lessons, practical exercises and internship activities.

To achieve these learning objectives, the degree course intends to provide its graduates with:

- A preparation in the subjects of basic sciences (mathematical, chemical, biological), which enables the acquisition of solid theoretical and practical skills in support of the characterizing disciplines;
- Basic knowledge of the mechanisms, composition, chemical-pharmaceutical and technological characteristics, therapeutic efficacy, contraindications, methods of use, regulations and any other indication regarding natural health products;
- Adequate knowledge of biochemistry, physiology, pathology, and nutrition, to provide valid support in the prevention of pathologies and in the management of treatments proposed by the doctor, promoting patient compliance;
- Adequate knowledge in the field of botany and pharmacognosy of medicinal plants, of pharmacological effects, interactions between vegetable principles and their use in herbal preparations and/or as nutraceuticals and/or health products;
- Adequate knowledge of the chemical composition and nutritional properties of transformed and non-transformed foods, fermented products, supplements, functional foods and special medical purpose foods, including aspects related to their production and quality and safety control, in order to ensure correct information and useful recommendations;
- Adequate knowledge in the field of phytosurveillance;
- Knowledge of the legislative contexts and professional and ethical responsibilities, necessary to undertake the profession independently and to contribute to the protection of citizens' health.
- The necessary knowledge and learning ability to face master's degree courses and master's and specialization courses.

Expected learning outcomes

Knowledge and understanding

At the end of this study path, students have acquired knowledge and understanding of issues related to the herbalist field and the production and development of natural health products, specifically on botanical, chemical, chemical-pharmaceutical, pharmacological, technological and regulatory aspects related to natural health products, also linked to their production and marketing. They also acquire fundamental knowledge of physiology, biochemistry, microbiology, pathology and toxicology, which allow them to understand the impact on the safety of the finished natural product, raw materials, formulation, preparation technologies and packaging characteristics. In the field of natural health products, graduates address issues related to development, production and quality control with methodological rigor; in particular, they acquire specific skills in professionalizing curricular profiles.

All teachings belonging to basic, characterizing and related scientific-disciplinary sectors contribute to achieving these

learning objectives, combining theoretical training with experimental activity in single-seat laboratories and exercises where students apply professional problems directly and indirectly related to the sector. Within the degree course, some teachings will be provided with innovative teaching methods.

The achievement of specific learning objectives for each teaching activity is verified through written and/or oral exams, other verification tests, practical laboratory activities in single-seat laboratories, classroom exercises and activities related to innovative teaching and in preparation and discussion of the final exam, as provided in the study plan.

Applying knowledge and understanding

At the end of the study path, students are able to apply the basic, theoretical and technical skills necessary to perform the profession of a natural health products expert, making them suitable to operate in the herbal, cosmetic and food sectors. The graduate is able to recognize, analyze and characterize herbal drugs and natural health products from a chemical-analytical and toxicological point of view. The multidisciplinary skills acquired in different areas allow the student to solve problems related to the development, production and formulation of natural active ingredients and their derivatives in accordance with current legislation.

These abilities are verified for each year of the course through practical laboratory activities in single-seat laboratories, classroom exercises and activities related to innovative teaching. The internship in public or private laboratories is of particular educational importance for putting into practice the acquired skills; the writing and discussion of the thesis allow to verify the student's ability to apply and integrate knowledge.

Making judgements

The autonomy of student judgment will be stimulated and developed critically from the beginning of the path. Teachers are committed to promoting opportunities for discussion with students on different topics involving disciplines from both a theoretical and practical and experimental point of view. The students' re-elaboration on the proposed topics is verified through written/oral exams and practical activities, including classroom exercises and practical tests in the laboratory, through group or individual work. The evaluation of the acquired skills includes verifying the student's ability to hypothesize a method to address problems modeled on real cases and to interpret the data related to them and is completed with the internship and the discussion of the thesis.

Communication skills

Graduates of the course are able to argue their positions and communicate the results of their analyses clearly and effectively, making use of up-to-date scientific-technological tools with full technical mastery. The expected learning outcomes include the ability to communicate in writing, based on the use of appropriate technical-scientific terminology and language, to present and critically evaluate, in a clear, coherent and concise manner, ideas and technical and methodological arguments, verified through reports, intermediate and final written and/or oral exams (relevant to each teaching), as well as in the final thesis. The ability to formulate and express, orally and in public, complex arguments in the technical and methodological field is verified through presentations and intermediate and final exams (relevant to each teaching). The ability to develop a complete and coherent original research dissertation on a complex topic, also using appropriate technological supports, is verified in the presentation of the final thesis, when the work carried out in the internship activity is presented orally, with the help of common presentation software, to the examination committee, which evaluates the candidate's ability to present the subject of the work and discuss it in the presence of the same. The ability to communicate in English (level B1) contributes to achieving these objectives.

Learning skills

The course of study aims to gradually lead its students to the frontier of scientific-technological knowledge in the reference disciplinary and interdisciplinary fields. For this reason, the degree course intends to primarily promote the development of further learning abilities by its students, as well as the acquisition of methodological and theoretical skills that allow its graduates to independently undertake activities of in-depth study and scientific-technological methodologies according to international standards, also for a possible continuation of studies in the field of master's degrees. The ultimate goal is continuous updating regarding the knowledge of the biological effects of natural products; phytochemistry; recognition of herbal drugs; analysis and dosage of active ingredients; knowledge of pharmacological and toxicological aspects; processing of natural products; management of the quality of natural products; identification of sophistications and possible contaminations; possible applications of natural products for health, cosmetic or food use. Expected learning outcomes: ability to organize ideas critically and systematically. Ability to identify, select and collect information through appropriate use of relevant sources. Ability to use libraries, databases, archives and paper and electronic repertoires to access relevant scientific and documentary information, also for continuous updating of knowledge. Ability to organize and implement an independent study plan. Ability to reflect on one's learning experience and adapt it in response to suggestions and stimuli from teachers or colleagues. Ability to recognize the need for further studies and appreciate the role of innovative learning methods and additional research activities. Ability to design and develop independent research, even if guided by a supervisor. The teaching organization of the degree course provides different types of in-progress activities to verify that the student's knowledge is verified: for each year of the course, through practical laboratory activities in single-seat laboratories, classroom exercises and activities related to innovative teaching, the correspondence between the information given and what the student has acquired is verified. In function of the type of course, written and/or oral exams allow a final verification of the acquired skills. In particular, during the internship, the student can verify that theoretical knowledge is translated into a real applied experience of particular relevance to his/her future professional activity. Through the writing and discussion of the thesis, the student verifies in summary the skills acquired during the entire study path.

Professional profile and employment opportunities

Herbal Technician

Job functions:

The graduate will be able to reach a high degree of autonomy in the workplace, allowing him/her to hold responsible positions in companies that deal with the marketing of natural products (phytotherapeutics, dietary supplements, functional foods, cosmetics); carry out information activities on the effectiveness, contraindications, methods of use and any other indication related to natural health products; prepare informative/divulgative material that accompanies natural health products; provide information on content, conservation, methods and times of use, purposes.

Skills:

The graduate will have theoretical and practical preparation in botanical, chemical and product use disciplines, as he/she will have specific preparation to interface with all those who operate in the field of medicinal plants.

- Agronomic, biological, botanical, phytochemical, microbiological skills, useful for carrying out control of medicinal plants, from production to post-harvest;
- Chemical, pharmacognostic and pharmacological skills related to active ingredients contained in medicinal plants;
- Knowledge of methodologies, techniques and instrumentation for chemical analyses;
- Ability to find, deepen and manage scientific information in the field of herbal drugs.

Occupational opportunities:

The graduate will be able to find employment in herbalist's shops, parapharmacies and pharmacies with herbalist's department and his/her tasks will be: extemporaneous preparations, packaging, retail sale. The graduate will be able to know all aspects related to interactions between natural products and between natural products and drugs and will be able to provide indications on the correct use of natural products, recommending or not recommending their use.

The graduate will be involved in the promotion of herbal, nutraceutical, dietary and cosmetic products and in the preparation of informative/divulgative material that accompanies such products.

In the agricultural field, the graduate will be able to assist the work of the agronomist, who operates in the field of cultivation and/or production of medicinal plants and will be able to carry out activities to protect the flora related to medicinal plants and control their collection, at state, regional and provincial administrations.

Knowledge in the field of natural products is constantly evolving in Europe and requires continuous cultural updating.

Following DPR 328 of 5 June 2001, graduates have the skills to access the State Examination for registration in Section B of the Chemists' Professional Register.

According to what is established in G.U. of 7 May 2019, graduates are admitted to the State Examination enabling the profession of Agricultural Technician and Graduate Agricultural Technician.

Technician for the development and production of natural products

Job functions:

The graduate will be able to reach a high degree of autonomy in the workplace, allowing him/her to hold responsible positions in companies that deal with the formulation/development and production of natural products for health; the graduate will be able to control and ensure the safety of finished products and raw materials, in order to guarantee their quality, in accordance with current laws.

The graduate will also be able to develop/produce a natural product at an industrial level, choosing the most suitable raw materials, according to the main quality criteria and the most suitable formulation.

Skills:

The graduate will have theoretical and practical preparation that will allow him/her to perform consulting and knowledge transfer functions in the field of health products based on natural substances, health, food, and cosmetic use, in companies dedicated to development and production.

- Agronomic, biological, botanical, phytochemical, microbiological skills, useful for carrying out control of plant material;
- Chemical, pharmacognostic and pharmacological skills related to active ingredients contained in natural health products;
- Knowledge of methodologies, techniques and instrumentation for chemical, biological, extractive and technological analyzes;
- Ability to find, deepen and manage scientific information in the field of natural health products.

Occupational opportunities:

The graduate will be able to provide information on: content, safety, quality, conservation, methods and use, purposes, activities of herbal, nutraceutical, dietary and cosmetic products, in public and private structures interested in information on products based on natural raw materials, such as laboratories, control and certification bodies/organizations of quality and in the editorial sector of the sector. Furthermore, he/she will be able to carry out consultancy activities in Hospital Companies and Poison Control Centers for aspects related to poisoning from plants and natural products.

The graduate will be able to perform tasks related to the design and formulation of new products, but also contribute to the identification of technologies necessary to obtain products of high quality and safety. He/she will therefore be able to perform quality assurance functions and will be involved in the development of analysis and quality control protocols for processes and services necessary in the production of the product. The graduate will be responsible and will have to ensure that periodic and correct inspections are carried out to evaluate the effectiveness and applicability of the quality assurance system.

The skills acquired in the regulatory and legislative field will allow the graduate to deal with the drafting and application of operational procedures to be used within the company and the applicable regulatory provisions. He/she will also be able to set up and maintain documentation to support the application for marketing authorization for products, interfacing, when necessary, with the regulatory bodies.

The graduate will be able to perform technical-analytical activities in private laboratories, the Chamber of Commerce and A.R.P.A., where routine analyzes are carried out on health products of natural origin, to carry out quality and Phyto surveillance controls of health products based on medicinal plants, guaranteeing in this way the safe use, for the protection of the consumer's health. Knowledge in the field of natural products is constantly evolving in Europe and requires continuous cultural updating.

Graduates have the right to register in the national register of herbalists managed by the Italian Herbalists Federation (FEI). The title is one of the requirements that give access to the State Examination for registration in Section B of the Chemists' Professional Register and to the profession of Agricultural Technician and Graduate Agricultural Technician, allowing them to practice respectively the profession of junior chemist or agricultural technician.

Initial knowledge required

Admission requirements and knowledge

To be admitted to the degree course, you must have a high school diploma, or another title obtained abroad, recognized as suitable, and have adequate initial preparation. A satisfactory familiarity with basic mathematical calculation, basic knowledge of cell biology and general chemistry, logical skills, oral and written expression skills, and a general culture are required.

Verification of knowledge and personal preparation

The possession of these requirements, as well as logical skills and comprehension of a text, will be verified through a TOLC-AV evaluation test, mandatory but not selective for enrollment, to be held before enrollment.

Additional learning requirements and recovery methods

Students who have obtained a score equal to or lower than 4 in mathematic module of the TOLC-AV test will have to meet additional learning requirements (OFA), to fill until the first-year. These obligations can be met by attending support activities organized by the University in the period October-December, followed by a recovery test with which the student must demonstrate improved preparation. In the absence of this evidence, the student will not be able to take the Principles of Mathematics and Computer Skills exam. For more information, see <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.

However, since the course is newly activated, those who will be exempted from the test will be enrolled in the Herbal Science and Technology course.

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 at single-seat laboratory exercises is mandatory.

Attendance at lecture courses is strongly recommended, but not mandatory.

Attendance at the lectures and classroom exercises of the first-year courses is recommended. Both attending and non-attending students will have access to the teaching material of the different courses via the MyARIEL IT platform through their university credentials.

Internship criteria

The training course includes a mandatory internship of 12 credits. These credits can be acquired through an internship period carried out at university facilities or at external bodies or companies, subject to signing an agreement with the University of Milan through COSP.

Degree programme final exams

To be admitted to the final test, the student must have acquired the 177 ECTS required by the teaching regulations.

During the final exam, which constitutes an individual training moment to complete the course undertaken, the student illustrates and publicly discusses a written paper, drawn up under the guidance of a teacher of the Degree Course.

The oral presentation of the paper may concern the activities carried out during the internship period, when this was carried out in a university research laboratory or in a company, or a compilation-type literature review on a topic agreed with the supervisor. Both the final exam and the essay can be presented in English.

Below is a detailed description of the types of theses envisaged.

EXPERIMENTAL THESIS: experimental works are those carried out by the graduate under the guidance of a tutor to articulate and demonstrate a hypothesis that leads to an original paper on a given topic.

COMPILATION THESIS: the compilation thesis consists in addressing a specific topic by consulting existing literature and presenting an original synthesis of the same which is based on the comparison and evaluation of the various sources consulted.

SEMI-EXPERIMENTAL THESIS: a thesis can be considered semi-experimental which addresses a topic on the basis of an

analysis of the literature which is accompanied by a real research activity lacking the relevance required for an experimental thesis due to less originality and/or less completeness.

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 Secretariat, 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 CdS offers enrolled students the opportunity to spend study and internship periods abroad through mobility programs mainly represented by Erasmus+. The European geographical areas in which the partner universities reside are located within the European Community and precisely indicated in the announcement. Mobility is aimed at studying (course attendance) and the possibility of carrying out a training internship which can be the subject of the degree thesis.

Recognition of study periods abroad: each student, depending on the length of time spent abroad, must propose a Learning Agreement which provides for training activities for an adequate number of ECTS: - one academic year: 60 ECTS; - one academic semester: 30 ECTS; - one academic quarter: 20 CFU. Students must acquire at least 70% of the credits provided for in the learning agreement. For thesis/internship activities, compliance means that the student has acquired all the credits provided for in the learning agreement. Credits are assigned based on the period spent abroad according to the following scheme: 3 months, 20 CFU; 6 months: 30 CFU; 9 months: 45 CFU. For students who have satisfactorily completed the training program, appropriate incentives are provided to be paid as an additional score to the graduation grade. This score ranges from a minimum of 1 to a maximum of 3 points (depending on the duration of the study period, the number of credits obtained and the overall result obtained) which, upon proposal of the responsible teacher, will be assigned by the Graduation Commission.

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 2025/26) Core/compulsory courses/activities common to all curricula		
Learning activity	Ects	Sector
Biology with elements of microbiology	8	(3) BIO/19, (5) BIO/13
English assessment B1 (3 ECTS)	3	NN
General and inorganic chemistry	6	CHIM/03
Human physiology	8	BIO/09
Organic chemistry	7	CHIM/06
Plant biology and pharmaceutical botany	12	BIO/15
Principles of mathematics and computer skills	6	(3) MAT/01, (3) INF/01
Qualitative/quantitative analysis of health and cosmetic products	7	CHIM/08
Total compulsory credits		57
2nd COURSE YEAR Core/compulsory courses/activities common to all curricula		
Learning activity	Ects	Sector
Biochemistry and human nutrition	10	(6) BIO/10, (4) BIO/09
Chemistry of health foods and phytocomplexes	10	(6) CHIM/10, (4) CHIM/06
General Pathology and physiopathology	6	MED/04
Identification and pharmacognostical analyses of officinal plants	8	(3) BIO/15, (5) BIO/14
Molecular bases of the action of health products	6	CHIM/08
Pharmacology and toxicology	10	BIO/14
Physiology and cultivation of medicinal plants	8	(5) AGR/13, (3) AGR/04
Principles of formulation of natural products and cosmetics	6	CHIM/09
Total compulsory credits		64
Further elective courses common to all curricula		
<p>During the third year, activated from the academic year 2026/27, the student must acquire 12 credits in training activities freely chosen from those activated by the University, upon presentation of an individual study plan via computer. To acquire these CFUs, the student can choose between different options: a) free choice courses of 6 CFUs activated specifically and included in the specific list proposed each year by the Study Manifesto; b) recognition of exams passed in any previous careers; c) free choice between all the courses offered by the University; d) training activities approved annually by the Teaching Committee among those present in the list of transversal skills proposed by the University. Mixed options are possible. In cases a), b) and d) the study plan is considered automatically approved. In case c) the study plan must be approved by the Teaching Committee, which will verify the actual consistency of the choices with the overall training path.</p>		

RECOGNITION OF CREDITS ACQUIRED ABROAD

Among the training activities that can be evaluated in credits, up to a maximum of 6 CFU, there is also the internship/training activity carried out within Erasmus, or through other mobility programs recognized by Pharmaceutical Sciences, which allow the recognition of a number of credits exceeding the 12 internship credits indicated in the study plan. Students who undertake a 6-month mobility for training/internships/experimental internships are entitled, in the event of a positive evaluation, to the recognition of 18 ECTS credits to be included in their study plan. For the methods of recognition of these credits, the student is invited to contact the Erasmus Coordinator of Pharmaceutical Sciences.

Ethnobotany and Ethnopharmacology	6	(3) BIO/15, (3) BIO/14
Herbal, cosmetic and nutraceutical markets	6	(3) AGR/01, (3) BIO/14
Microscopy as tool for quality control of plants	6	BIO/15
Natural products for the skin	6	(3) BIO/09, (3) BIO/14
Physiology and natural products for physical exercise	6	(3) BIO/09, (3) BIO/14
Principles and chemistry of dietary products	6	(3) BIO/09, (3) CHIM/10
Research and pharmacological development of natural products	6	(3) BIO/14, (3) BIO/13
End of course requirements common to all curricula		
Final Exam	3	NN
Stage	12	NN
Total compulsory credits		15

ACTIVE CURRICULA LIST

Herbal Sciences Course years currently available: 2°

Development and production of natural products Course years currently available: 2°

CURRICULUM: [E19-A] Herbal Sciences

Qualifying Training Objectives

The Herbal Science curriculum aims at training graduates competent in the rational and informed use of marketed herbal products and medicinal plants, thus ensuring safety of use to protect consumer health.

Skills acquired

The graduates acquire theoretical and practical knowledge in the disciplines of botany, phytochemistry and pharmacognosics, and will have developed the ability to understand and solve problems related to the herbal field in order to interface with all those working in the area of medicinal plants.

Notes

The Herbal Science curriculum focuses on the disciplines essential for holding positions of responsibility in herbalists, carrying out information activities about the efficacy, safety and methods of use related to natural products for human health.

3rd COURSE YEAR (available as of academic year 2026/27) Core/compulsory courses/activities Curriculum-specific features Herbal Sciences

Learning activity	Ects	Sector
Advanced chemistry and analysis of herbal products	9	CHIM/08
Efficacy and safety of herbal products	11	BIO/14
Herbal technology and legislation	6	CHIM/09
Pharmacognosy applied to the herbal sector	6	BIO/14
Total compulsory credits		32

CURRICULUM: [E19-B] Development and production of natural products

Qualifying Training Objectives

The curriculum Development and Production of Natural Products focuses on training graduates competent in the design, development and production of natural products derived from both extractive and fermentative processes, involved in health, food and personal well-being areas.

Skills acquired

The graduates acquire knowledge of botanical, chemical, chemical-pharmaceutical, technological and regulatory aspects related to natural health products, also related to their industrial production. He/she will be able to deal with issues related to the development, production and quality control of natural health products.

Notes

The curriculum Development and Production of Natural Products aims at imparting the theoretical and practical knowledge that will enable graduates to deal with the complex multidisciplinary process leading to the development, production and

control of raw materials and the finished product in the industrial field, with specific reference to natural health products, in accordance with the relevant regulations.

3rd COURSE YEAR (available as of academic year 2026/27) Core/compulsory courses/activities Curriculum-specific features Development and production of natural products		
Learning activity	Ects	Sector
Experimental models for natural products design	6	BIO/14
Pharmacognosy applied to the industrial sector and phytovigilance	7	BIO/14
Production and analysis of natural products of extractive and fermentative origin	12	(4) CHIM/11, (8) CHIM/08
Technological and regulatory aspects of natural products and cosmetics	7	CHIM/09
Total compulsory credits		32

COURSE PROGRESSION REQUIREMENTS

To ensure adequate student training and promote the learning of knowledge in an orderly and homogeneous manner, some prerequisites have been established between different subjects, as detailed in the table below. The prerequisites defined as compulsory are binding.

RULES FOR ACCESS TO SINGLE-DESK EXERCISES

Some subjects include CFU of single-desk exercises (ESEPS). Exercises are distributed rationally over the three years of study and have a progressive degree of complexity. Therefore, the following access rules have been established:

Attendance at laboratory exercises in the context of the integrated courses of:

Qualitative and quantitative analysis of health products and cosmetics
 Food chemistry of health products and phytocomplexes
 Principles of formulation of natural and cosmetic products
 Efficacy and safety of herbal products
 Advanced chemistry and analysis of herbal products
 Herbal and legislative technology
 Production and analysis of natural products of extractive and fermentative origin
 Technological and regulatory aspects of natural and cosmetic products
 Applied pharmacognosy in the industrial sector and phytovigilance.

It is mandatory and will result in the registration of the attendance signature.

Access to the Chemistry of Healthy Foods and Phytocomplexes laboratory is subject to passing the general and inorganic chemistry exam.

Access to the laboratory of Technological and regulatory aspects of natural products and cosmetics is subject to the acquisition of the attendance signature of the laboratory of Principles of formulation of natural products and cosmetics.

Access to the Herbal Technology and Legislation laboratory is subject to the acquisition of the attendance signature of the Principles of Formulation of Natural Products and Cosmetics laboratory.

Access to the chemistry and advanced analysis of herbal products laboratory is subject to the acquisition of the attendance signature of the qualitative/quantitative analysis of health and cosmetic products laboratory and passing the general and inorganic chemistry and organic chemistry exams.

Access to the production and analysis laboratory of natural products of extractive and fermentative origin is subject to the acquisition of the attendance signature of the qualitative/quantitative analysis laboratory of health and cosmetic products and to passing the general and inorganic chemistry exams and Organic chemistry and Advanced chemistry and analysis of herbal products.

Access to the Efficacy and safety of herbal products and Pharmacognosy applied to the industrial sector and phytovigilance laboratory is subject to passing the examination for recognition and pharmacognostic analysis of medicinal plants.

Learning activity	Prescribed foundation courses	O/S
Chemistry of health foods and phytocomplexes	General and inorganic chemistry	Core/compulsory
	Organic chemistry	Core/compulsory
General Pathology and physiopathology	Human physiology	Core/compulsory
	Biology with elements of microbiology	Core/compulsory
Physiology and cultivation of medicinal plants	Plant biology and pharmaceutical botany	Core/compulsory
	Organic chemistry	Core/compulsory
Molecular bases of the action of health products	General and inorganic chemistry	Core/compulsory
	Organic chemistry	Core/compulsory
Pharmacology and toxicology	Human physiology	Core/compulsory
Efficacy and safety of herbal products	General Pathology and physiopathology	Core/compulsory
	Pharmacology and toxicology	Core/compulsory
	Plant biology and pharmaceutical botany	Core/compulsory
	Human physiology	Core/compulsory

	Biology with elements of microbiology	Core/compulsory
	Identification and pharmacognostical analyses of officinal plants	Core/compulsory
Advanced chemistry and analysis of herbal products	Chemistry of health foods and phytocomplexes	Core/compulsory
	Molecular bases of the action of health products	Core/compulsory
	General and inorganic chemistry	Core/compulsory
	Qualitative/quantitative analysis of health and cosmetic products	Core/compulsory
	Organic chemistry	Core/compulsory
Herbal technology and legislation	Principles of formulation of natural products and cosmetics	Core/compulsory
Pharmacognosy applied to the herbal sector	Pharmacology and toxicology	Core/compulsory
	Plant biology and pharmaceutical botany	Core/compulsory
	Human physiology	Core/compulsory
	Biology with elements of microbiology	Core/compulsory
	Identification and pharmacognostical analyses of officinal plants	Core/compulsory
Production and analysis of natural products of extractive and fermentative origin	Chemistry of health foods and phytocomplexes	Core/compulsory
	Molecular bases of the action of health products	Core/compulsory
	General and inorganic chemistry	Core/compulsory
	Qualitative/quantitative analysis of health and cosmetic products	Core/compulsory
	Organic chemistry	Core/compulsory
Experimental models for natural products design	General Pathology and physiopathology	Core/compulsory
	Pharmacology and toxicology	Core/compulsory
	Human physiology	Core/compulsory
	Biochemistry and human nutrition	Core/compulsory
Technological and regulatory aspects of natural products and cosmetics	Principles of formulation of natural products and cosmetics	Core/compulsory
Pharmacognosy applied to the industrial sector and phytovigilance	General Pathology and physiopathology	Core/compulsory
	Pharmacology and toxicology	Core/compulsory
	Plant biology and pharmaceutical botany	Core/compulsory
	Human physiology	Core/compulsory
	Biology with elements of microbiology	Core/compulsory
	Identification and pharmacognostical analyses of officinal plants	Core/compulsory
Biochemistry and human nutrition	Human physiology	Core/compulsory
	Biology with elements of microbiology	Core/compulsory
	Organic chemistry	Core/compulsory
Identification and pharmacognostical analyses of officinal plants	Plant biology and pharmaceutical botany	Core/compulsory
	Biology with elements of microbiology	Core/compulsory