UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2024/25
SINGLE-CYCLE DEGREE
Pharmaceutical Chemistry and Technology (Classe LM-13)
enrolled from 2009/10 academic year until 2020/21

HEADING

Degree classification - Denomination and code:	LM-13 Pharmacy and industrial pharmacy
Degree title:	Dottore Magistrale
Length of course:	5 years
Total number of credits required to complete programme:	300
Years of course currently available:	5th
Access procedures:	Cap on student, student selection based on entrance test
Course code:	E25

PERSONS/ROLES

Head of Interdepartmental Study Programme

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Degree Course website

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Student registrar

Sedi e orari: https://www.unimi.it/it/node/360

Student registrar

Contatti: https://www.unimi.it/it/node/359 Phone 02 503 25032

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The Master Course in Pharmaceutical Chemistry and Technology aims to train students in chemical, pharmacological, technological and regulatory fields useful to work in positions of responsibility and coordination, in all sectors directly or indirectly connected to the design, development, production, control and marketing of medicinal products and health care ones. The course also provides preparation for the profession of pharmacist in local and hospital settings and for medical information (REP). Thanks to multidisciplinary skills, the course aims to train professionals able to satisfy the needs of the pharmaceutical, cosmetic, medical devices and food supplements industry, as well as the needs of public and private institutions involved in research and regulation of the sanitary area.

Expected learning outcomes

To achieve these educational objectives, The Master Course in Pharmaceutical Chemistry and Technology intends to provide its graduates with:

1) preparation in the disciplines of the basic sciences (mathematics, physics, chemistry, biology, medicine), which allows the acquisition of solid theoretical and practical skills to support the characterizing disciplines;

2) in-depth chemical-pharmaceutical, biochemical and pharmacological knowledge, essential for the design and development of new biologically active molecules;

3) scientific and technological knowledge necessary for the design, development and control for medicines and health products dosage forms;

4) knowledge of national and supranational legislation concerning medicines and health products;

5) planning and operational skills needed to face research in the sectors characterizing the degree course, through training activities related to the thesis, which must be experimental;

6) useful knowledge for the professional performance of the pharmaceutical service within the national health service through training activities relating to professional training according to directive 2005/36/EC.

7) necessary knowledge to face the specialization courses and the specialization schools of the Pharmaceutical and Pharmacological Area Class. With this purpose, the Degree Course in Pharmaceutical Chemistry and Technology focuses particularly on the chemical, biochemical, technical and chemical-pharmaceutical disciplines, also through practical laboratory activities. Other in-depth knowledge concerns aspects relating to the stability, toxicity and formulation of both medicines and health products.

Professional profile and employment opportunities

Graduates in Pharmaceutical Chemistry and Technology possess the scientific and theoretical expertise to operate as experts in the field of drug and healthy products (foods for special medical purposes and special diets, cosmetics, herbal, diagnostic, medical devices, etc.) and in related fields and to take on the professional role of pharmacist.

The Master Course in Pharmaceutical Chemistry and Technology trains to develop multiple professional activities:

- synthesis, pharmaceutical development, manufacturing and control of medicines in industry;
- quality control of medicines in public or private laboratories;
- production and control of biocides, medical devices and medical-surgical aids;
- formulation, production and quality control of dietetic food products;
- formulation, production and quality control of cosmetic products;
- analysis and control of the physical-chemical and hygienic characteristics of mineral waters;
- storage, conservation and distribution of medicines in the wholesale phase;
- preparation, control, storage and distribution of medicines in pharmacies open to the public or in hospital pharmacies.
- Dissemination of information and advice in the health products sector.

With the achievement of the master's degree and the relative professional qualification, the graduate in Pharmaceutical Chemistry and Technology can carry out the profession of pharmacist, according to the law 2005/36/EC. Thanks to the strong chemical-technological-pharmaceutical characterization, The master's degree course in Pharmaceutical Chemistry and Technology guarantees concrete employment prospects in the sector of chemical-pharmaceutical, technological-pharmaceutical, pharmacological and biotechnological research, both public and private, as well as in the sectors of development, production and quality control in the pharmaceutical, cosmetic and food industries.

The course trains students for the following professions:

- Medicinal Chemists
- Chemistry and pharmaceutical Company representatives
- Pharmacologists
- Pharmacists
- Researchers and technicians with degrees in chemical and pharmaceutical sciences
- Researchers and technicians with degrees in biological sciences

Initial knowledge required

Admission requirements

Admission to Year I of the degree programme in Pharmaceutical Chemistry and Technology is conditioned to pass a selective online test (TOLC-F). A merit ranking will be drawn up based on the test score.
Applicants will be required to take the test before enrolment. The schedule of TOLC-F tests held by our and other Italian universities is available at https://tolc.cisiaonline.it/calendario.php

Admission assessment

For admission to the degree programme, please refer to the call for applications available on the University website at https://ctf.cdl.unimi.it/it/iscriversi
Waivers from test requirements and admission to years subsequent Year I are governed by the call for applications.
For information: https://ctf.cdl.unimi.it/it/iscriversi

Additional learning requirements (OFA) and remedial activities

Students who have not achieved at least 4 points in the basic mathematics module of TOLC-F will have to fulfil additional learning requirements (OFA). For this purpose, they will attend remedial activities organized by the University, and then take a remedial test to prove they have filled their gaps. Students with OFA may not take the Mathematic exam before fulfilling said requirements.
Learn more at https://ctf.cdl.unimi.it/it/studiare/le-matricole

Candidates who took the test and were not admitted may enrol in a limited number of single courses (with up to 30 places available), as provided by academic regulations, to earn credits to be used for future enrolment in a degree programme, upon passing the admission test, if any.
For enrolment procedures, please refer to the call for applications at https://ctf.cdl.unimi.it/it/iscriversi

Transfer students

In case of transfer from another degree programme or from another university, admission to years subsequent to Year I will be subject to an assessment of the student's previous academic career by the Interdepartmental Academic Board. Please refer to the call for applications for details.

Compulsory attendance

Attendance is mandatory for laboratory courses, and strongly recommended for other courses.

Internship criteria

Students are required to complete an internship awarding 30 credits (CFU) in a retail or hospital pharmacy under the supervision of the Pharmaceutical Service in order to sit the State exam and qualify as pharmacists.
The student may undertake the internship the second semester of Year IV, but after they have earned at least 150 CFU for all first- and second-year exams, as well as some third-year exams, including Pharmacology and Pharmacotherapy or Medicinal Chemistry I. Pharmaceutical Technology and Legislation I is also recommended. Before starting the internship, the student will be required to follow general and specific safety training courses held by the University and the Association of Pharmacists, respectively.

Learn more on Pharmacy internships at https://www.unimi.it/en/node/12683

The Pharmacy internship must last six months full-time pursuant to art. 44(2)(b) of European Directive 2005/36/EC.

Degree programme final exams

Students can start working on their degree thesis in the second semester of Year IV, after submitting a self-certified of their academic career to their thesis supervisor. The student can begin thesis work only after passing at least 20 exams. Please note that only full courses will count towards the total number of exams. Individual modules will not be taken into consideration. Upcoming graduates must have earned 275 CFU before sitting the final exam, which will award a further 25 credits. The final exam consists in presenting and defending a paper on experimental research conducted by the student under the guidance of a supervisor in the laboratories of the University or other public or private entities. Experimental research means research that the student conducted under the supervision of a tutor, resulting in an original paper on a specific topic. The supervisor must always be a faculty member. The degree mark (66 to 110 points, possibly cum laude) will be assigned by a special board in public session and will consider the student's full academic career.

Notes

For-credit assessment B2

In order to obtain their degree, students must be proficient in English at a B2 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 B2 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 January 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 B2 or higher level.

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

Programs offered:
- Erasmus + studio and Erasmus+Traineeship at Universities/Institutions partners in Europe and in the Balkans;
- stages at i) Departments of Medicine and Pharmacology, University of Minnesota US; ii) Universitè de Montrèal (Canada)

The offer is continously updated. Call for new position abroad can be found on the University websit (Cerca una opportunità internazionale | Università degli Studi di Milano Statale (unimi.it))
Activities: the mobility is directed to attending courses, research internships and training in Hospital Pharmacy.
The Erasmus + Studio programme offers the opportunity to study or play an internship abroad. The Erasmus traineeship allows to carry out research in Universities and partner Companies in a wide range of scientific topics characterizing the Course of Study. For detailed information on the host institution and fields of studies, see the following web site: https://www.unimi.it/en/education/pharmaceutical-chemistry-and-technology.
Activities that will be carried out abroad must be defined in the Learning Agreement along with the CFU, based on the time that students will spent in the foreign University. The following rules to assign CFU hold:
- 12 months: 60 credits
- 6 months: 30 credits
- 3 months: 20 CFU.

Thesis/Stage
- 3 months 20 ECTS (6 ECTS in the student study programme + 14 ECTS complementary)
- 6 months 30 ECTS (18 in the student study programme + 12 complementary)
- 9 months 45 CFU (24 in the student study programme + 21 complementary)

Internship in Hospital pharmacy
Internship in Hospital pharmacy could not be longer than for 3-months corresponding to 20 CFU (15 in the student study programme + 5 complementary). Students need to contact the Ordine dei Farmacisti to verify that the Hospital pharmacy chosen is appropriate and must open the “libretto di tirocinio” before departure. This activity follows the rules of the prerequisites reported in the Manifesto.
Recognition of the abroad studies: students must acquire at least 70% of the credits specified in the Learning Agreement. For thesis/internship researches, the student must acquire all the credits reported in the Learning Agreement.
Incentives: An additional score (1-3 points depending on the duration of the study period, the amount of credits attained and the obtained results) will be proposed by the tutor and awarded by the thesis committee to the students who have satisfactorily accomplished the training program.

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 2021/22) Core/compulsory courses/activities common

Learning activity	Ects	Sector
ANALYTICAL CHEMISTRY	6	CHIM/01
Animal Biology and Plant Biology	9	BIO/15, BIO/13
Calculus	7	MAT/05
Computer Science Course	3	INF/01
English proficiency B2 (2 ECTS)	2	ND
General and Inorganic Chemistry and Stoichiometry	10	CHIM/03
Human Anatomy and Physiology	11	BIO/09, BIO/16
Physics	8	FIS/01
Total compulsory credits	56	

2nd COURSE YEAR (disactivated from academic year 2022/23) Core/compulsory courses/activities common

Learning activity	Ects	Sector
Applied Microbiology	6	BIO/19
Biochemistry	8	BIO/10
DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	12	CHIM/10, CHIM/08
General Pathology	6	MED/04
Organic Chemistry 1	10	CHIM/06
PHARMACOGNOSY	8	BIO/15
PHYSICAL CHEMISTRY	6	CHIM/02
QUALITATIVE ANALYSIS OF INORGANIC DRUGS	6	CHIM/08
Total compulsory credits	62	

3rd COURSE YEAR (disactivated from academic year 2023/24) Core/compulsory courses/activities common

Learning activity	Ects	Sector
Applied Biochemistry	8	BIO/10
Extractive and Synthetic Preparation of Drugs and Laboratory of Extractive and Synthetic Preparation of Drugs	6	CHIM/08
Medicinal Chemistry 1	10	CHIM/08
Organic Chemistry 2 and Organic Chemistry Laboratory	10	CHIM/06
PHARMACOLOGY AND PHARMACOTHERAPY	8	BIO/14
Spectroscopic methods in organic chemistry	7	CHIM/06
Toxicology	8	BIO/14
Total compulsory credits	57	

4th COURSE YEAR (disactivated from academic year 2024/25) Core/compulsory courses/activities common

Learning activity	Ects	Sector
DRUG ANALYSIS 2 AND LABORATORY OF DRUG ANALYSIS 2	10	CHIM/08
Medicinal Chemistry 2	10	CHIM/08
Pharmaceutical Technology and Legislation I	9	CHIM/09
Pharmaceutical Technology and Legislation II	9	CHIM/09
Total compulsory credits	38	

Elective courses

Al quarto anno di corso, lo studente dovrà scegliere uno tra i sette profili professionalizzanti, ciascuno di sedici crediti. La segnalazione della preferenza dovrà essere effettuata compilando l'apposito modulo disponibile sul sito o presso la Segreteria Didattica Interdipartimentale. I corsi si svolgono tutti nel secondo semestre del IV anno.

a) Science of drug development profile		
Advanced methodologies in Medicinal Chemistry	8	CHIM/08
Analytical methods in drug discovery and development and validation of analytical procedures in pharmaceutical industry	8	CHIM/08
b) Pharmaceutics and pharmaceutical technology profile		
Advances in Drug Delivery Systems (modules I and II)	8	CHIM/09
Formulation and Regulatory Affairs of Health Products and Pharmaceutical Regulatory Affairs and Patents	8	CHIM/09
c) Experimental pharmacology profile		
Molecular and Cellular Pharmacology and Experimental Pharmacology	8	BIO/14
Pharmacological in biotechnology and Molecular Biology	8	(4) BIO/11, (4) BIO/14
d) Pharmacological and therapeutic profile		

Biotechnological drugs: pharmaco-toxicological aspects and Pharmaceutical Regulatory Affairs and Patents		8	(4) BIO/14, (4) CHIM/09
Clinical Pharmacology and Pharmacoepidemiology and Pharmacoeconomics		8	BIO/14
e) Molecular and supramolecular chemistry: analysis and synthesis profile			
Inorganic nanoparticles in life sciences and advanced characterization techniques		8	(4) CHIM/03, (4) CHIM/06
Organometallic chemistry and fine chemical applications		8	(4) CHIM/03, (4) CHIM/06
f) Chemical methods applied to biomolecules profile			
Innovative methods for synthesis and analysis		8	CHIM/06
Synthetic Aspects in Biomolecules Preparation and Application of biomolecules in biological systems studies		8	(4) BIO/10, (4) CHIM/06
g) Endocrinology and metabolism profile			
Endocrinolgy and metabolism		8	MED/13
Nutritional requirement during lifetime and pathological aspects of nutrition		8	(5) BIO/09, (3) MED/05

5th COURSE YEAR Core/compulsory courses/activities common			
Learning activity		**Ects**	**Sector**
Industrial Pharmacy and Laboratory of Pharmaceutical Technology		8	CHIM/09
	Total compulsory credits	8	

Elective courses			
Lo studente dovrà scegliere un insegnamento, del valore di otto crediti, o due insegnamenti, ciascuno del valore di quattro crediti, tra quelli di seguito elencati. Gli insegnamenti a scelta libera saranno attivati sulla base delle richieste degli studenti. Le eventuali propedeuticità saranno indicate dai docenti titolari dei corsi.			
Cosmetic Products		8	CHIM/09
Experimental laboratory		8	ND
Heterocyclic compounds and application of organometallic chemistry in synthesis		8	(4) CHIM/03, (4) CHIM/06
Innovative drugs and radiopharmaceuticals		8	CHIM/08
Innovative molecular approaches for the identification of pharmacological targets		8	BIO/10
Methodologies and experimental models for therapy with hormones		8	(4) MED/13, (4) BIO/13
Physiology of Integrated systems I		8	BIO/09
Special Systems Pharmacology		8	BIO/14

End of course requirements			
FINAL EXAM		21	NA
FINAL EXAM		4	NA
Professional training in pharmacy (first part)		5	NA
Professional training in pharmacy (second part)		25	NA
	Total compulsory credits	55	

COURSE PROGRESSION REQUIREMENTS

If new prerequisites are added, students are required to respect them if they are inserted in the Manifesto of the academic year preceding the one in which is expected to take the exam.

1st YEAR

There are no course progression requirements constraints for the disciplines that the student enrolled in the first year of the course is required to attend.

2nd YEAR

Admission to the LABORATORY OF QUALITATIVE ANALYSIS OF INORGANIC DRUGS is subject to passing the General and Inorganic Chemistry and Stoichiometry exam. Admission to the LABORATORY OF DRUG ANALYSIS 1 is subject to attendance at the LABORATORY OF QUALITATIVE ANALYSIS OF INORGANIC DRUGS. The PHARMACOGNOSY exam is subject to passing the Animal Biology and Plant Biology and Human Anatomy and Physiology exams.

3rd YEAR

Starting from those enrolled in the A.Y. 2016/17, in order to enrol in the third year of the course, students must have taken all the first year exams by 30 September with marks out of thirty. Those who do not take the required exams will automatically be placed in the repeating second year.

Admission to the Laboratory of Extractive and Synthetic Preparation of Drugs is subject to attendance of the LABORATORY OF ORGANIC CHEMISTRY Organic Chemistry Laboratory and passing of the Organic Chemistry I exam (by the beginning of the second semester of the third year). Admission to the Organic Chemistry Laboratory is not subject to passing the Organic Chemistry I exam.

4th YEAR

Admission to the LABORATORY OF DRUG ANALYSIS 2 is subject to passing the Organic Chemistry I exam (by the course start date) and the LABORATORY OF DRUG ANALYSIS 1 attendance and the Laboratory of Extractive and Synthetic Preparation of Drugs.

Medicinal Chemistry 1 (Compulsory), DRUG ANALYSIS 1 + LABORATORY OF DRUG ANALYSIS 1 + FOOD CHEMISTRY (Compulsory) and Spectroscopic methods in organic chemistry
(Compulsory) are preparatory courses for the PROFESSIONALIZING PROFILE COURSES IN SCIENCE AND DRUG DEVELOPMENT.

PHARMACOLOGY AND PHARMACOTHERAPY (Compulsory), ORGANIC CHEMISTRY I (Compulsory), DRUG ANALYSIS 1 + LABORATORY OF DRUG ANALYSIS 1 + FOOD CHEMISTRY (Compulsory), Physics
(Compulsory) and Pharmaceutical Technology and Legislation I (Recommended) are preparatory courses for the PROFESSIONALIZING PROFILE COURSES IN APPLICATION TECHNOLOGY.

PHARMACOLOGY AND PHARMACOTHERAPY (Compulsory) is preparatory to the PROFESSIONALIZING PROFILE COURSES IN EXPERIMENTAL PHARMACOLOGICAL.

PHARMACOLOGY AND PHARMACOTHERAPY (Compulsory) is preparatory to the PROFESSIONALIZING PHARMACOLOGICAL COURSES IN THERAPEUTIC PHARMACOLOGICAL.

ORGANIC CHEMISTRY II + Organic Chemistry Laboratory (Compulsory), APPLIED BIOCHEMISTRY (Compulsory) are preparatory courses for the PROFESSIONALIZING PROFILE IN CHEMICAL METHODOLOGIES APPLIED TO BIOMOLECULES.

ORGANIC CHEMISTRY I (compulsory) and ORGANIC CHEMISTRY II + Organic Chemistry Laboratory (Compulsory), are preparatory courses for the PROFESSIONALIZING PROFILE IN SYNTHESIS AND MOLECULAR AND SUPRAMOLECULAR CHARACTERIZATION.

GENERAL PATHOLOGY (Compulsory) is preparatory to the COURSES OF THE ENDOCRINE AND NUTRITIONAL PROFESSIONALIZING PROFILE.

5th YEAR
Attendance at the Laboratory of Pharmaceutical Technology is subject to passing the PHYSICS, Medicinal Chemistry 1 and PHARMACOLOGY AND PHARMACOTHERAPY exams.

Starting from those enrolled in the A.Y. 2018/19, in order to graduate, students must have acquired a knowledge of the English language with a B2 level of proficiency.
The exams indicated in the second column must be taken before those indicated in the first column

Learning activity	**Prescribed foundation courses**	**O/S**
Spectroscopic methods in organic chemistry	Organic Chemistry 1	Core/compulsory
Applied Microbiology	Human Anatomy and Physiology	Core/compulsory
	Animal Biology and Plant Biology	Core/compulsory
General Pathology	Human Anatomy and Physiology	Core/compulsory
	Animal Biology and Plant Biology	Core/compulsory
QUALITATIVE ANALYSIS OF INORGANIC DRUGS	ANALYTICAL CHEMISTRY	Core/compulsory
DRUG ANALYSIS 2 AND LABORATORY OF DRUG ANALYSIS 2	DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	Core/compulsory
Medicinal Chemistry 1	Organic Chemistry 1	Core/compulsory
Medicinal Chemistry 2	Medicinal Chemistry 1	Core/compulsory
	Organic Chemistry 2 and Organic Chemistry Laboratory	Core/compulsory
Extractive and Synthetic Preparation of Drugs and Laboratory of Extractive and Synthetic Preparation of Drugs	Organic Chemistry 1	Core/compulsory
Pharmaceutical Technology and Legislation I	Physics	Core/compulsory
	Organic Chemistry 1	Core/compulsory
	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
	DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	Core/compulsory
Pharmaceutical Technology and Legislation II	Physics	Core/compulsory
	Organic Chemistry 1	Core/compulsory
	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
	DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	Core/compulsory
Industrial Pharmacy and Laboratory of Pharmaceutical Technology	Pharmaceutical Technology and Legislation I	Core/compulsory
Biochemistry	Human Anatomy and Physiology	Core/compulsory
Analytical methods in drug discovery and development and validation of analytical procedures in pharmaceutical industry	Spectroscopic methods in organic chemistry	Core/compulsory
	Medicinal Chemistry 1	Core/compulsory

	DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	Core/compulsory
Advances in Drug Delivery Systems (modules I and II)	Pharmaceutical Technology and Legislation I	Core/compulsory
	Physics	Core/compulsory
	Organic Chemistry 1	Core/compulsory
	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
	DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	Core/compulsory
Formulation and Regulatory Affairs of Health Products and Pharmaceutical Regulatory Affairs and Patents	Pharmaceutical Technology and Legislation I	Core/compulsory
	Physics	Core/compulsory
	Organic Chemistry 1	Core/compulsory
	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
	DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	Core/compulsory
Molecular and Cellular Pharmacology and Experimental Pharmacology	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
Clinical Pharmacology and Pharmacoepidemiology and Pharmacoeconomics	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
Biotechnological drugs: pharmaco-toxicological aspects and Pharmaceutical Regulatory Affairs and Patents	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
Inorganic nanoparticles in life sciences and advanced characterization techniques	Organic Chemistry 2 and Organic Chemistry Laboratory	Core/compulsory
Organometallic chemistry and fine chemical applications	Organic Chemistry 2 and Organic Chemistry Laboratory	Core/compulsory
Innovative methods for synthesis and analysis	Applied Biochemistry	Core/compulsory
	Organic Chemistry 2 and Organic Chemistry Laboratory	Core/compulsory
Synthetic Aspects in Biomolecules Preparation and Application of biomolecules in biological systems studies	Applied Biochemistry	Core/compulsory
	Organic Chemistry 2 and Organic Chemistry Laboratory	Core/compulsory
Endocrinolgy and metabolism	General Pathology	Core/compulsory
Nutritional requirement during lifetime and pathological aspects of nutrition	General Pathology	Core/compulsory
Advanced methodologies in Medicinal Chemistry	Spectroscopic methods in organic chemistry	Core/compulsory
	Medicinal Chemistry 1	Core/compulsory
	DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	Core/compulsory
Toxicology	PHARMACOGNOSY	Core/compulsory
PHARMACOGNOSY	Human Anatomy and Physiology	Core/compulsory
	Animal Biology and Plant Biology	Core/compulsory
Applied Biochemistry	Biochemistry	Core/compulsory
	Organic Chemistry 1	Core/compulsory
Pharmacological in biotechnology and Molecular Biology	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
Organic Chemistry 1	General and Inorganic Chemistry and Stoichiometry	Core/compulsory
PHARMACOLOGY AND PHARMACOTHERAPY	General Pathology	Core/compulsory
	Biochemistry	Core/compulsory
	PHARMACOGNOSY	Core/compulsory
Organic Chemistry 2 and Organic Chemistry Laboratory	Organic Chemistry 1	Core/compulsory
DRUG ANALYSIS 1 AND LABORATORY OF DRUG ANALYSIS 1 AND FOOD CHEMISTRY	ANALYTICAL CHEMISTRY	Core/compulsory
PHYSICAL CHEMISTRY	General and Inorganic Chemistry and Stoichiometry	Core/compulsory