



**UNIVERSITA' DEGLI STUDI DI MILANO**  
**PROGRAMME DESCRIPTION - ACADEMIC YEAR 2021/22**  
**SINGLE-CYCLE DEGREE**  
**Pharmacy (Classe LM-13)**  
**enrolled from 2009/10 academic year**

### **HEADING**

<b>Degree classification - Denomination and code:</b>	LM-13 Pharmacy and industrial pharmacy
<b>Degree title:</b>	Dottore Magistrale
<b>Length of course:</b>	5 years
<b>Total number of credits required to complete programme:</b>	300
<b>Years of course currently available:</b>	1st , 2nd , 3rd , 4th , 5th
<b>Access procedures:</b>	Cap on student, student selection based on entrance test
<b>Course code:</b>	E24

### **PERSONS/ROLES**

#### **Head of Interdepartmental Study Programme**

Prof. Marco Riva

#### **Tutors - Faculty**

Tutor per l'orientamento (suddivisione studenti in base a cognome):

Primo biennio

A-C Prof. Roberto Maggi

D-F Dr.ssa Silvia Araneo

G-L Prof.ssa Patrizia Limonta

M-R Prof. Alessandro Pedretti

S-Z Prof.ssa Roberta Moretti

Secondo triennio

A-D Prof. Alberico Luigi Catapano

E-H Dr.ssa Alessandra Colciago

I-M Dott.ssa. Gabriella Roda

N-Q Prof.ssa Marina Montagnani Marelli

R-Z Prof. Angelo Sala

Referente studenti lavoratori, studenti con disabilità e DSA, studenti stranieri

Prof.ssa Irma Colombo

Tutor per la mobilità internazionale e l'Erasmus

Prof.ssa Stefania Ceruti

Tutor per trasferimenti/riconoscimento crediti

Prof.ssa Irma Colombo

Tutor per tirocinio professionale in Farmacia

Coordinatore Prof.ssa Paola Minghetti

Tutor accademici (suddivisione studenti in base a cognome):

Silvia Araneo (A, D)

Chiara Grazia Milena Gennari (B)

Irma Colombo (C)

Carla Perego (F, L)

Marica Orioli (E, G, H, I)

Luca Palugan (J, K, L, N, V, Z)

Alessandro Pedretti (M)

Patrizia Restani (O, P, Q)

Alessandra Colciago (R, T, U)

Ermanno Valoti (S, W, X, Y)

#### **Degree Course website**

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

Via Trentacoste, 2 - Milano Previo appuntamento telefonico o e-mail Email: irma.colombo@unimi.it

Via Balzaretti, 9 - Milano Previo appuntamento telefonico o e-mail Email: m.riva@unimi.it

Via Mangiagalli, 25 - Milano Previo appuntamento telefonico o e-mail Email: ermanno.valoti@unimi.it

Via Trentacoste, 2 - Milano Previo appuntamento telefonico o e-mail Email: irma.colombo@unimi.it

Via Golgi, 19 - Milano Previo appuntamento telefonico (02 50314572) o e-mail Email: scienze.farmaco@unimi.it

Via Balzaretti, 9 - Milano Email: m.riva@unimi.it

Via Balzaretti, 9 - Milano Email: m.riva@unimi.it

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

Contatti: <https://www.unimi.it/it/node/359> Phone 0250325032

<https://www.unimi.it/it/studiare/immatricolarsi-e-iscrivarsi>

## **CHARACTERISTICS OF DEGREE PROGRAMME**

### **General and specific learning objectives**

The aim of the Degree Course in Pharmacy is to provide a range of theoretical and practical knowledge in the biological, chemical, pharmaceutical, technological, pathophysiological, pharmacological and toxicological fields, which will allow graduates to deal with the entire sequence of the complex and multidisciplinary process that from structural design leads to the production, marketing and correct use of the prescription drug, according to codified standards. The Degree Course in Pharmacy also provides advanced scientific preparation in the healthcare field aimed at forming a professional figure of expert in the drugs and their use for therapeutic purposes. This specialized figure will be capable of serving as a fundamental element of connection between patient, doctor and public health structures, collaborating in monitoring the drug on the territory, the implementation of the therapy in both the local and hospital areas and will provide the patient and the doctor all the proper indications for a correct use of prescription drugs. On these bases, graduates from the Degree Course in Pharmacy will possess the scientific bases and the theoretical and practical knowledge necessary to exercise the profession of pharmacist and to operate as experts of drugs and health products (medical devices, medical-surgical devices, cosmetics, dietetics, food supplements, herbal products, in vitro diagnostics).

### **Expected learning outcomes**

To achieve these educational objectives, the Degree Course in Pharmacy will provide the graduates the following:

- 1) a strong preparation on basic science topics (physical, chemical, biological, medical) with the aim of becoming acquainted with the scientific approach for solving problems inherent to his/her professional activity;
- 2) a thorough knowledge of the composition, technological characteristics, therapeutic efficacy, contraindications, ways of use, regulations and any other indication relating to the drugs;
- 3) the ability to apply the acquired scientific knowledge (chemical, biological, pharmaceutical, pharmacological, toxicological, technological, legislative and deontological) in the dosage of drugs, in the recognition of drugs with purity tests, and in the preparation of galenics;
- 4) adequate knowledge of biochemistry, pathophysiology and nutrition to be able to provide valid support in the therapeutic activities proposed by the doctor, promoting compliance and therefore the therapeutic result;
- 5) adequate knowledge in the field of drug-epidemiology and pharmacovigilance, aspects increasingly required for the correct use of drugs in the population;
- 6) knowledge of the legislative contexts and of their professional and ethical responsibilities necessary to undertake the profession in full autonomy;
- 7) the knowledge and learning ability required to face the specialization courses and Schools in Pharmaceutical and Pharmacological Areas.

To this end, the Degree Course in Pharmacy focuses in particular on the chemical (general and inorganic chemistry, organic chemistry), biochemical, technical- and chemical-pharmaceutical, pharmacological disciplines and also emphasizes practical laboratory activities. Other in-depth areas concern the aspects related to stability, toxicity, formulation, research and development, and information for medicines and health products. Graduates in Pharmacy should have acquired multidisciplinary knowledge, which is essential for understanding the active substance, its structure and activities in relation to the interaction with biomolecules at a cellular and systemic level.

### **Professional profile and employment opportunities**

The professional profile of pharmacist generated will be of a healthcare professional who contributes to the achievement of the objectives set by the National Health Service in the context of his scientific and technological multidisciplinary skills, in order to adequately respond to the changing needs of the society in the health field.

With the achievement of the Degree in Pharmacy and the related professional qualification, graduates will carry out, in accordance with Directive 2005/36 / EC, and subsequent amendments, the profession of pharmacist and will be authorized to exercise the following professional activities:

- preparation of the pharmaceutical form of drugs;
- manufacture and control of drugs;
- control of drugs in control laboratories
- storage, conservation and distribution of drugs in the wholesale trade phase;

- preparation, control, storage and distribution of drugs in pharmacies open to the public;
- preparation, control, storage and distribution of drugs in hospitals (hospital pharmacies);
- dissemination of information and advice in the field of drugs use.

These activities fall within the minimum common field coordinated by this directive; the training course may also consider other professional activities carried out in the European Union in the field of drugs in order to allow equal employment opportunities in the European context.

## Notes

In order to get their degree, students are required to certify their knowledge of the English language at the B2 level. This level can be certified in one of the following ways:

- By submitting their language certificate, taken no more than 3 years before its submittal and attesting a B2 or higher level (for the list of the language certificates which are accepted by the University of Milan, please refer to the website: <http://www.unimi.it/studenti/100312.htm>). Students can submit their language certificate during the immatriculation procedure.

- By sitting the placement test run by SLAM, during the first year exclusively, from September to December. Should they not pass the Placement Test, students will have to attend the English language course organized by SLAM. All students who do not have a valid language certificate must sit the Placement Test. Those students who do not sit the Placement test by December or do not pass the end of course test in one of the 6 attempts granted will have to get a language certificate outside the University of Milan within their degree.

## **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 and other Extra-EU 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**

Thanks to mobility programs such as Erasmus +, Erasmus + Placement, and Erasmus Mundus, the Degree Course in Pharmacy offers its students the opportunity to spend training periods abroad. The Erasmus Placement Program also offers the possibility of carrying out a training internship abroad in companies as well as in other organizations or universities.

University and Institution partners involved in these programs mainly reside in Europe and the Balkan regions.

The locations, with whom Agreements have been established, offer the possibility of carrying out activities in a wide range of areas. During the mobility period, the student can:

- continue his/her studies by attending courses and the respective exams;
- carry out the thesis;
- carry out the internship in Hospital Pharmacies.

Each student is followed by a tutor identified within the Course.

Procedure for the recognition of study periods abroad: each student must propose a Learning Agreement regarding the training activities that lead to the recognition of a number of credits adequate for the period of stay abroad, namely:

- 60 credits for an academic year;
- 30 credits for an academic semester;
- 20 credits for an academic quarter;
- 20 credits for the internship period in the hospital pharmacy whose maximum duration is 4 months.

The study period abroad will be recognized as valid upon the acquisition of at least 70% of the credits specified in the learning agreement, while the thesis or internship activity will be considered valid only after acquisition of all credits.

For students who have satisfactorily accomplished the training program, the appropriate incentives, proposed by the teacher in charge, will be given by the Faculty's Commission during the graduation session. More specifically, additional points will be added to the degree mark, varying from a minimum of 1 to a maximum of 3 points depending on the duration of the study period, the amount of credits attained, and the overall results obtained by the student.

### **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 generally begins around February each year with the publication of a call for applications specifying the destinations, with the respective programme duration (from 2/3 to 12 months), requirements and online application deadline. Every year, before the deadline for the call, the University organizes informative meetings to illustrate opportunities and rules for participation to students.

#### Erasmus+ scholarship

The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which is 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.

Learn more at <https://www.unimi.it/en/international/study-abroad/studying-abroad-erasmus>

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](mailto:mobility.out@unimi.it)

Student Desk booking through InformaStudenti

<b>1st COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
Analytical Chemistry	8	CHIM/01
Animal Biology	7	BIO/13
Calculus and Statistics	6	MAT/05
English proficiency B2 (2 ECTS)	2	ND
General and Inorganic Chemistry and Stoichiometry	10	CHIM/03
Human Anatomy	9	BIO/16
Physics	6	FIS/01
Plant Biology and Pharmaceutical botany	8	BIO/15
	Total compulsory credits	56
<b>2nd COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
APPLIED MICROBIOLOGY AND HYGIENE	10	(10) BIO/19, (10) MED/42
General Biochemistry	6	BIO/10
General Pharmacology and Pharmacognosy	10	BIO/14
Inorganic Analysis of Substances having Pharmaceutical Interest and Qualitative Analysis Laboratory	7	CHIM/08
Organic Chemistry	10	CHIM/06
Physiology	11	BIO/09
	Total compulsory credits	54
<b>3rd COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
Computer Science Course	3	INF/01
General Pathology and Pathophysiology	11	MED/04
Medicinal Chemistry 1	10	CHIM/08
Metabolic and Functional Biochemistry	8	BIO/10
Nutrition Physiology and Pharmacology, and Dietetic products	10	(3) BIO/09, (4) CHIM/10, (3) BIO/14
PHARMACOLOGY AND PHARMACOTHERAPY	10	BIO/14
Principles of quantitative pharmaceutical analysis and Laboratory for quantitative analysis	8	CHIM/08
	Total compulsory credits	60
<b>4th COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
Assays and methods of analysis of the Pharmacopoeias and lab of drug identification	12	CHIM/08
Chemotherapy and biological drugs	8	BIO/14
Medicinal Chemistry 2	10	CHIM/08
Pharmaceutical Technology and Legislation I and Laboratory of Pharmaceutical Technology I	12	CHIM/09
Toxicology	10	BIO/14
	Total compulsory credits	52
<b>Elective courses</b>		
Drug development and scientific communication	8	BIO/14
Experimental laboratory	8	ND

Metabolic diseases	8	(4) MED/13, (4) MED/05
Pharmaceutical market and Regulatory aspects of health products	8	CHIM/09
PHYTOPHARMACY	8	BIO/14
<b>5th COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
APPLIED PHARMACOLOGY	7	BIO/14
Pharmaceutical Technology and Legislation II and Lab of Pharmaceutical Technology II Medical Devices and Cosmetic prod	12	CHIM/09
Toxicological Chemistry and Laboratory of Chemical and Toxicological Analysis	6	CHIM/08
	Total compulsory credits	25
<b>End of course requirements</b>		
FINAL EXAM	15	NA
Professional training in pharmacy (first part)	10	NA
Professional training in pharmacy (second part)	20	ND
	Total compulsory credits	45

## COURSE PROGRESSION REQUIREMENTS

The attendance at the laboratory courses is mandatory and it is mandatory the enrollment to such laboratories. For the modality and timing of the enrollment in laboratory courses, students must carefully consult the website of the Degree Course <https://www.unimi.it/it/corsi/corsi-di-laurea/farmacia-ciclo-unico>, and the Ariel website of the teachers, who is responsible for the specific laboratory.

### ADMISSION TO LABORATORIES

The admission to the LABORATORY QUALITATIVE OF ANALYSIS is subordinate to passing the exam of GENERAL AND INORGANIC CHEMISTRY, AND STOICHIOMETRY, by February 28 of the academic year of attendance of the laboratory itself.

The admission to the LABORATORY OF QUANTITATIVE ANALYSIS is subordinate to the attendance (not to passing the exam) of the LABORATORY QUALITATIVE OF ANALYSIS. Since the LABORATORY OF QUANTITATIVE ANALYSIS is dispensed in the second semester, the laboratory of qualitative analysis can be attended in the first semester of the same academic year.

The admission to the LABORATORY OF DRUG IDENTIFICATION is subordinate to passing the exam of the PHARMACEUTICAL AND TOXICOLOGICAL CHEMISTRY I by January 31st and to the attendance (not to passing the exam) of the LABORATORY OF QUANTITATIVE ANALYSIS.

The admission to the LABORATORY OF PHARMACEUTICAL TECHNOLOGY I is subordinate to passing the exam of ORGANIC CHEMISTRY and to the attendance (not passing the exam) of the LABORATORY OF QUANTITATIVE ANALYSIS.

The admission to the LABORATORY OF PHARMACEUTICAL TECHNOLOGY II is subordinate to the attendance (not passing the exam) of the LABORATORY OF PHARMACEUTICAL TECHNOLOGY I.

The admission to the LABORATORY OF CHEMICAL AND TOXICOLOGICAL ANALYSIS is subordinate to the attendance (not the passing of the exam) of the LABORATORY OF DRUG IDENTIFICATION.

### PREREQUISITES TO EXAMS

Concerning the prerequisites for the exams, students can take the exams listed in the left column of the table below only after having passed the exams reported in the right column.

Removal of prerequisites to exams - If an exam is not included in the right column of the Student Information Booklet, but it was reported in the Student Information Booklets of previous academic years, the removal of this prerequisite is extended to all students, regardless of their year of enrollment.

Addition of prerequisites to exams - If new prerequisites to exams are inserted in the Student Information Booklets, students must respect them if they are present in the Student Information Booklets of the academic year preceding the one in which they take the exam.

Learning activity	Prescribed foundation courses	O/S
APPLIED PHARMACOLOGY	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
PHARMACOLOGY AND PHARMACOTHERAPY	General Biochemistry	Core/compulsory
	Physiology	Core/compulsory
	General Pharmacology and Pharmacognosy	Core/compulsory
	Metabolic and Functional Biochemistry	General Biochemistry

General Biochemistry	General and Inorganic Chemistry and Stoichiometry	Core/compulsory
	Animal Biology	Core/compulsory
Medicinal Chemistry 2	Medicinal Chemistry 1	Core/compulsory
Medicinal Chemistry 1	Organic Chemistry	Core/compulsory
	Physiology	Core/compulsory
Organic Chemistry	General and Inorganic Chemistry and Stoichiometry	Core/compulsory
General Pathology and Pathophysiology	General Biochemistry	Core/compulsory
	Physiology	Core/compulsory
Nutrition Physiology and Pharmacology, and Dietetic products	General Biochemistry	Core/compulsory
	Physiology	Core/compulsory
	General Pharmacology and Pharmacognosy	Core/compulsory
Pharmaceutical Technology and Legislation I and Laboratory of Pharmaceutical Technology I	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
	Medicinal Chemistry 1	Core/compulsory
	Physiology	Core/compulsory
Toxicological Chemistry and Laboratory of Chemical and Toxicological Analysis	Assays and methods of analysis of the Pharmacopoeias and lab of drug identification	Core/compulsory
Assays and methods of analysis of the Pharmacopoeias and lab of drug identification	Medicinal Chemistry 1	Core/compulsory
	Principles of quantitative pharmaceutical analysis and Laboratory for quantitative analysis	Core/compulsory
Principles of quantitative pharmaceutical analysis and Laboratory for quantitative analysis	Inorganic Analysis of Substances having Pharmaceutical Interest and Qualitative Analysis Laboratory	Core/compulsory
Inorganic Analysis of Substances having Pharmaceutical Interest and Qualitative Analysis Laboratory	General and Inorganic Chemistry and Stoichiometry	Core/compulsory
	Analytical Chemistry	Core/compulsory
Physiology	General and Inorganic Chemistry and Stoichiometry	Core/compulsory
	Animal Biology	Core/compulsory
	Physics	Core/compulsory
	Calculus and Statistics	Core/compulsory
	Human Anatomy	Core/compulsory
APPLIED MICROBIOLOGY AND HYGIENE	Animal Biology	Core/compulsory
	Human Anatomy	Core/compulsory
Metabolic diseases	General Pathology and Pathophysiology	Core/compulsory
Drug development and scientific communication	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
PHYTOPHARMACY	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
Pharmaceutical market and Regulatory aspects of health products	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
	Nutrition Physiology and Pharmacology, and Dietetic products	Core/compulsory
Pharmaceutical Technology and Legislation II and Lab of Pharmaceutical Technology II Medical Devices and Cosmetic prod	Medicinal Chemistry 2	Core/compulsory
	Pharmaceutical Technology and Legislation I and Laboratory of Pharmaceutical Technology I	Core/compulsory
	Chemotherapy and biological drugs	Core/compulsory
General Pharmacology and Pharmacognosy	Animal Biology	Core/compulsory
	Plant Biology and Pharmaceutical botany	Core/compulsory
	Human Anatomy	Core/compulsory
Toxicology	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
Chemotherapy and biological drugs	PHARMACOLOGY AND PHARMACOTHERAPY	Core/compulsory
	APPLIED MICROBIOLOGY AND HYGIENE	Core/compulsory