



# UNIVERSITÀ DEGLI STUDI DI PALERMO

Department: Biological, Chemical and Pharmaceutical Sciences and Technologies

A.Y. 2023/2024

## DEGREE COURSE IN PHARMACY

### Characteristics



### Educational objectives

Consistent with the EEC Directive 85/432, the 2nd cycle degree course in Pharmacy provides the theoretical and practical training needed to carry out the profession of Pharmacist. Consistent with Ministerial Decree 1147/2022, graduates in Pharmacy qualify for the profession, when taking and passing the final examination.

Pharmacists must be prepared to perform the duties of a health professional with multi-disciplinary scientific competences (chemical, biological, pharmaceutical, pharmacological, toxicological, and technological) within the national health service and consistently with its objectives. The course also provides adequate skills in the technological-regulatory and economic-managerial fields, considering the evolution of professional educational needs of graduates in the class Lm-13

Graduates in Pharmacy are authorized to carry out the following professional activities: professional expert of drugs and health products (including medical devices, diagnostic products and health products, dietary products, herbal products and cosmetics); expert in the quality control, storage, preservation and distribution of drugs in the wholesale and pharmacies open to the public and hospital pharmacies, information and advice in the field of drug and over-the-counter products, in direct relationship with the public.

Mandatory professional training, in a public pharmacy or in a hospital under the supervision of pharmaceutical services for not less than six months is awarded with 30 credits (equivalent to 750 hours).

Course outline.

The first four years of the course provide core, class specific, related, and integrative educational activities, as well as "other educational activities" and further skills, through the autonomous choice of educational activities among the ones suggested by the Degree Course and the ones offered by the University. The fifth course year is mostly devoted to practical professional training and to the preparation of the final dissertation. The structure of the course provides students with a gradual and constant progression of their competence level.

The specific learning outcomes of the degree course will be achieved through:

- Core activities (mathematics, physics, chemistry, biology, and medicine) useful for a sound scientific background, introductory to the understanding and advancement in class specific subjects.
- Class specific activities (chemical, biological, pharmaceutical, pharmacological and technological competences), needed to acquire command of the chemical and structural features of active ingredients, pharmaceutical forms and raw materials used for the formulation of therapeutic preparations, as well as of the pharmacological bases of their action, including pharmaco-therapeutic, toxicological aspects, etc., and activities providing economics-business issues, consistent with the new educational needs of graduates in class L-13.
- educational activities aiming at the knowledge of laws and deontological norms useful for the various aspects of professional activity.
- Class related and integrative activities with respect to biology and food chemistry, completing their professional education. Elective activities for 12 credits in total will be also provided, integrating the above-mentioned activities.

The degree course aims at providing graduates with a good knowledge of English language.

All scientific sectors are covered by and adequate number of credits, both at theoretical and experimental level, divided in more course years, thus providing graduates with advanced knowledge and competences in the pharmaceutical sector.

### Professional opportunities

Profile:

Pharmacist, Chemist and similar professions, Researcher and Industrial Operator in Pharmaceutical Sciences

Functions:

The graduate in Pharmacy possesses the solid theoretical and applicative cultural bases of a professional capable of managing the entire sequence of the complex multidisciplinary process which, starting from the design, leads to the production,

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formulation, control and dispensation of the drug. After obtaining the professional qualification of Pharmacist, he/she can perform all the functions required by law for this profession and in particular:

- preparation of the pharmaceutical form of medicines in industry;
- control of medicines in a public or private medicine control laboratory;
- storage, preservation and distribution of medicines at the wholesale stage;
- preparation, control, storage and distribution of medicines in pharmacies open to the public;
- preparation, control, storage and distribution of medicines in public or private hospitals (hospital pharmacies);
- dissemination of information and advice in the field of medicines, cosmetic, dietetic and nutritional, herbal products, for the maintenance and protection of health status;
- formulation, production, packaging, quality and stability control and toxicological evaluation of cosmetic products;
- production of pesticides, pesticides and medical aids;
- analysis and control of the physical-chemical and hygienic characteristics of mineral waters;
- analysis and quality control of food products, including products destined for a particular diet;
- production and control of medical devices and medical-surgical devices;
- transformation, mixing, concentration and fractionation of parts of plants and their derivatives, both for therapeutic and herbal purposes.

Furthermore, graduates in Pharmacy have the possibility, according to the D.P.R. 5.6.2001 n.328, to take the State Examination for the registration to the section A of the Professional Register of Chemists, which allows the exercise of the relative professional activities.

The functions that graduates may have in these working areas are mostly related to: planning, research and development; biological analysis, qualitative and quantitative analysis of substances having biological or toxicological activity; production and formulation; quality control; patenting, registration and marketing; promotion, distribution and marketing; management positions of laboratories; everything required by the profession of pharmacist and the profession of chemist.

#### Skills:

The skills associated with the pharmacist function are:

- knowledge of medicines and substances used for their manufacture;
- knowledge of pharmaceutical technology and physical, chemical, biological and microbiological control of medicines;
- knowledge of the metabolism and effects of medicines, as well as the action of toxic substances and the use of the medicines themselves;
- knowledge enabling to evaluate scientific data concerning medicinal products to be evaluated so that appropriate information can be provided on this basis;
- knowledge of the rules and conditions governing the exercise of pharmaceutical activities.

#### Professional opportunities:

Graduates in Pharmacy carry out their professional activity at: public or private pharmacies; hospital pharmacies; chemical-pharmaceutical, biotechnological, food, cosmetic and health products industries; CRO (clinical research monitoring company); service company for the pharmaceutical and life science sector; public and private laboratories of chemical-toxicological, environmental and biochemical clinical analysis; industries that operate in the toxicological-environmental field; regulatory agencies; schools, universities and other public and private research institutions.

#### Final examination features

The final exam of the single-cycle degree course in pharmacy and industrial pharmacy - class LM-13 qualifies to practice the profession of pharmacist. To this end, the final exam includes a practical evaluation test of the professional skills acquired with the practical evaluation internship, aimed at ascertaining the level of technical preparation of the candidate for the qualification to practice the profession, and the discussion of the thesis. The practical evaluation internship is a training course of a professional nature aimed at providing the skills necessary for carrying out the activities of the pharmacist within the National Health Service, both in a pharmacy open to the public and/or in a hospital pharmacy or at the territorial pharmaceutical services under the supervision of the pharmaceutical service. The final test consists of the preparation of a written dissertation related to the gathering and critical processing of bibliographic materials or other data related to the course cultural and professional content (compilatory dissertation), or an experimental activity about an original (mono- or multidisciplinary) topic, carried out in a research laboratory in which a member of the Faculty works, or in other public or private facilities, under specific agreements (experimental dissertation). The original dissertation, prepared by the student under the guidance of a supervising professor is publicly discussed in front of a Board of Professors, and final mark will be awarded out of 110.

Subjects 1 <sup>o</sup> year	CFU	Sem.	Val.	SSD	TAF
21257 - ANIMAL BIOLOGY <i>Arizza(PO)</i>	6	1	V	BIO/05	A
00133 - GENERAL AND INORGANIC CHEMISTRY <i>Rubino(RU)</i>	10	1	V	CHIM/03	A
01650 - PLANT BIOLOGY AND PHARMACOGNOSIS - INTEGRATED COURSE	9	1	V		
- PHARMACOGNOSIS <i>Venturella(RU)</i>	6	1		BIO/14	B

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Subjects 1 ° year	CFU	Sem.	Val.	SSD	TAF
- PLANT BIOLOGY <i>Spadaro(PA)</i>	3	1		BIO/02	C
20692 - ENGLISH LANGUAGE SKILLS - EQUIVALENT TO LEVEL B1	3	1	G		E
01286 - HUMAN ANATOMY <i>Campanella(PO)</i>	6	2	V	BIO/16	A
18247 - MICROBIOLOGY <i>Schillaci(PO)</i>	7	2	V	BIO/19	A
19181 - PHYSICS WITH ELEMENTS OF MATHEMATICS <i>D'Oca(PA)</i>	10	2	V	FIS/07	A
01115 - COMPUTING SKILLS	4	2	G		F
20691 - ENGLISH LANGUAGE SKILLS - EQUIVALENT TO LEVEL B2	3	2	G		E

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Subjects 2 ° year	CFU	Sem.	Val.	SSD	TAF
01799 - ANALYTICAL CHEMISTRY <i>Bongiorno(PA)</i>	6	1	V	CHIM/01	A
01933 - ORGANIC CHEMISTRY <i>Buscemi(PO)</i>	10	1	V	CHIM/06	A
09065 - PHARMACEUTICAL ANALYSIS OF DRUGS I <i>Barreca(RD) [A-L], Montalbano(PA) [M-Z]</i>	10	1	V	CHIM/08	B
19178 - GENERAL AND MOLECULAR BIOCHEMISTRY <i>Tesoriere(PO)</i>	12	2	V	BIO/10	B
23360 - GENERAL AND NUTRITION PHYSIOLOGY - INTEGRATED COURSE	12	2	V		
- GENERAL PHYSIOLOGY <i>Baldassano(PA)</i>	8	2		BIO/09	A
- PHYSIOLOGY OF NUTRITION	4	2		BIO/09	C
23361 - HYGIENE, PREVENTIVE MEDICINE AND PUBLIC HEALTH <i>Costantino(PA)</i>	6	2	V	MED/42	A

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Subjects 3 ° year	CFU	Sem.	Val.	SSD	TAF
19170 - GENERAL AND CLINICAL PATHOLOGY AND MEDICAL TERMINOLOGY <i>Vasto(PA)</i>	8	1	V	MED/04	A
01215 - PHARMACEUTICAL ANALYSIS OF DRUGS 2 <i>Diana(PO) [A-L], Raimondi(PA) [M-Z]</i>	10	1	V	CHIM/08	B
01873 - PHARMACEUTICAL AND TOXICOLOGICAL CHEMISTRY 1 <i>Barraja(PO)</i>	10	1	V	CHIM/08	B
23359 - APPLIED BIOCHEMISTRY FOR SERVICE PHARMACY <i>Pintaudi(RU)</i>	10	2	V	BIO/10	B
19174 - DIETARY FOOD AND PRODUCTS <i>Di Stefano(PA)</i>	6	2	V	CHIM/10	B
19173 - GENERAL PHARMACOLOGY AND PHARMACOTHERAPY <i>Poma(PA)</i>	10	2	V	BIO/14	B
19179 - PHARMACEUTICAL TECHNOLOGY <i>Pitarresi(PO)</i>	8	2	V	CHIM/09	B

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Subjects 4 ° year	CFU	Sem.	Val.	SSD	TAF
19175 - DRUG AND BIOMOLECULE ANALYSIS <i>Martorana(PA) [A-L], Martorana(PA) [M-Z]</i>	8	1	V	CHIM/08	B
01870 - MEDICINAL AND TOXICOLOGICAL CHEMISTRY 2 <i>Parrino(PA)</i>	10	1	V	CHIM/08	B
19171 - PHARMACEUTICAL FORMS <i>Pitarresi(PO)</i>	8	1	V	CHIM/09	B
19172 - DRUG REGULATIONS AND GALENICAL PREPARATIONS LABORATORY <i>Palumbo(PO) [A-L], Craparo(PA) [M-Z]</i>	10	2	V	CHIM/09	B
07645 - TOXICOLOGY <i>Venturella(RU)</i>	10	2	V	BIO/14	B
23398 - PRACTICAL EVALUATION INTERNSHIP (TPV) I	15	2	G		S

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Subjects 5 ° year	CFU	Sem.	Val.	SSD	TAF
23368 - DRUG SURVEILLANCE, DRUG ECONOMICS AND PHARMACY MANAGEMENT - INTEGRATED COURSE	12	1	V		
- DRUG SURVEILLANCE AND PHARMACOECONOMICS <i>Craparo(PA)</i>	6	1		CHIM/09	B
- PHARMACY MANAGEMENT	6	1		SECS-P/08	B
23397 - PRACTICAL EVALUATION INTERNSHIP (TPV) II	15	1	G		S
19168 - BIOTECHNOLOGICAL DRUGS <i>Diana(PO)</i>	6	2	V	CHIM/08	C
05917 - FINAL EXAMINATION	18	2	G		E
Free subjects (suggested)	12				D

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### OPTIONAL SUBJECTS

Free subjects (suggested)	CFU	Sem.	Val.	SSD	TAF
16467 - BIOCHEMISTRY OF ORGANS AND SPECIALISED TISSUES <i>Tesoriere(PO)</i>	6	2	V	BIO/10	D
19167 - COSMETIC PRODUCT TECHNOLOGY <i>De Caro(PA)</i>	6	2	V	CHIM/09	D
23354 - MARKETING AND COMMUNICATION IN PHARMACY	6	2	V	SECS-P/08	D

### PROPAEDEUTICAL TEACHINGS

01215 - PHARMACEUTICAL ANALYSIS OF DRUGS 2					
09065 - PHARMACEUTICAL ANALYSIS OF DRUGS I					
01799 - ANALYTICAL CHEMISTRY					
01799 - ANALYTICAL CHEMISTRY					
00133 - GENERAL AND INORGANIC CHEMISTRY					
01870 - MEDICINAL AND TOXICOLOGICAL CHEMISTRY 2					
01873 - PHARMACEUTICAL AND TOXICOLOGICAL CHEMISTRY 1					
01873 - PHARMACEUTICAL AND TOXICOLOGICAL CHEMISTRY 1					
01933 - ORGANIC CHEMISTRY					

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01933 - ORGANIC CHEMISTRY  
00133 - GENERAL AND INORGANIC CHEMISTRY

09065 - PHARMACEUTICAL ANALYSIS OF DRUGS I  
00133 - GENERAL AND INORGANIC CHEMISTRY

19171 - PHARMACEUTICAL FORMS  
19179 - PHARMACEUTICAL TECHNOLOGY

19172 - DRUG REGULATIONS AND GALENICAL PREPARATIONS LABORATORY  
19179 - PHARMACEUTICAL TECHNOLOGY

19175 - DRUG AND BIOMOLECULE ANALYSIS  
01215 - PHARMACEUTICAL ANALYSIS OF DRUGS 2

19179 - PHARMACEUTICAL TECHNOLOGY  
01933 - ORGANIC CHEMISTRY