

Faculty of Pharmacy

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Five-Year Degree (laurea magistrale) in Pharmaceutical Chemistry and Technology Class 13/M Pharmacy and Industrial Pharmacy

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Presentation

Effective academic year 2001-2002, the program of studies for the undergraduate degree in Pharmaceutical Chemistry and Technology was converted into a five-year graduate degree called the "corso di laurea magistrale". [The Italian system has a three-year undergraduate degree, the "laurea triennale" and a two-year graduate degree, the "laurea magistrale." In the case of CTF, there is a single course of studies, lasting five years, which leads to this graduate degree.] Students wishing to enrol in this degree program must have a high school degree according to current regulations.

Transfer students from other degree programs (diploma, undergraduate degree or graduate degree) of the same university or other universities will be enrolled in the "laurea magistrale," the five-year degree program.

Students already enrolled may opt for the reformed degree program.

Objectives

The five-year "magistrale" degree program in Pharmaceutical Chemistry and Technology provides advanced scientific preparation in industrial pharmaceuticals, with particular attention to drug design, synthesis, development, preparation and quality control according to the regulations of Italian and European Pharmacopeias. In addition, the degree program provides the preparation essential for the profession of Pharmacist in public and private pharmacies and in hospital pharmacies according to the terms of directive number 85/432/CEE.

In particular, the five-year "laurea magistrale" degree program in CTF provides specific formation in each sector of the multidisciplinary process which, starting with structural design, leads to synthesis, experimentation, registration, production, and quality control of drugs, and the procedures for bringing them to the market.

In addition, the University of Camerino curriculum also provides graduates with advanced methodological preparation that gives them design skills and knowledge in chemistry, pharmaceuticals and toxicology useful for the manipulation of drugs in hospitals, research centers, analysis laboratories and industrial settings.

Occupational opportunities

Graduates in Pharmaceutical Chemistry and Technology have a complete cultural preparation in the sphere of pharmaceuticals and the vast range of health-related products such as foods, dietetic products, cosmetics and medical-surgical aids, affording them numerous professional opportunities. They have interesting options for research work at universities, foundations, and industries; in facilities for production and transformation of chemical products (pharmaceuticals, cosmetics, dietetic products, parasitocidal products); in the food industry, in quality control; and as analysts at public and private inspection laboratories (A.S.L., hospitals, etc.). Other sectors of considerable interest for the CTF graduate are those of pharmaceutical patenting, drug documentation and registration, marketing, direction of production facilities for galenics and cosmetics, scientific publishing, and work as pharmaceutical representatives. On the basis of European Union regulations, the CTF graduate can be certified for the function of technical director of pharmaceutical production.

Entry into the world of work is considerably facilitated for CTF graduates by the fact that they can gain membership in both the Order of Pharmacists and the Order of Chemists.

Entry into research activity is facilitated for University of Camerino CTF graduates because this institution offers doctoral research positions in chemistry and biology, in particular in Drug

Chemistry and Biology.

Admission requirements

While the knowledge necessary to pass the national high school exit examination is deemed necessary and sufficient, admission to the degree program in Pharmacy also requires an entrance test to identify any lacunae in the student's preparation and direct him or her to the appropriate university-provided pre-admission courses and tutoring services to resolve the deficits.

The pre-admission courses are held before the beginning of lessons, while the tutoring courses are held in pre-established periods during the academic year. The schedule is published at Faculty President's Secretariat (Segreteria di Presidenza della Facoltà) and at the Student Registrar (Segreterie Studenti).

Curriculum

Students earn the degree in Pharmaceutical Chemistry and Technology after passing 24 exams and earning 300 credits (CFU), as indicated below:

TABLE 1: COURSES AND MODULES FIRST YEAR PHARMACEUTICAL CHEMISTRY AND TECHNOLOGY CLASS LM-13						
N	COURSE	Total CFU	Modules	CFU per SSD	Type of module and related credits (a,b,c,d,e,f,g,s)	Score or pass/fail
1	PHYSICS AND COMPUTER SCIENCE	10	PHYSICS	7 FIS/03	A	SCORE
			COMPUTER SCIENCE	3 INF/01		
2	MATEMATICS	5		MAT/06	A	SCORE
3	GENERAL AND INORGANIC CHEMISTRY	12		CHIM/03	A	SCORE
4	CELLULAR BIOLOGY AND HUMAN ANATOMY	9		BIO/16	A	SCORE
5	ANALYTICAL CHEMISTRY - METHODOLOGIES OF ANALYSIS OF DRUGS	10	ANALYTICAL CHEMISTRY	5 CHIM/01	A	SCORE
			METHODOLOGIES OF ANALYSIS OF DRUGS	5 CHIM/08	B	
6	ENGLISH	6		L-LIN/12	3E	PASS/FAIL
					3F	
SECOND YEAR						
7	ORGANIC CHEMISTRY I	9		CHIM/06	A	SCORE
8	PHYSICAL CHEMISTRY	7		CHIM/02	A	SCORE
9	PHYSIOLOGY	7		BIO/09	A	SCORE
10	MICROBIOLOGY - GENERAL PATHOLOGY	10	MICROBIOLOGY	5 MED/07	A	SCORE
			GENERAL PATHOLOGY	5 MED/04	A	

11	BIOCHEMISTRY - APPLIED BIOCHEMISTRY	10	BIOCHEMISTRY	6 BIO/10	B	SCORE
			APPLIED BIOCHEMISTRY	4 BIO/10	B	
12	ANALYSIS OF DRUGS 1	9		9 CHIM/08	B	SCORE
THIRD YEAR						
13	PHARMACOLOGY AND PHARMACOTHERAPY I	10		BIO/14	B	SCORE
14	ANALYSIS OF DRUGS II	9		CHIM/08	B	SCORE
15	ORGANIC CHEMISTRY II - PHYSICAL METHODS IN ORGANIC CHEMISTRY	14	ORGANIC CHEMISTRY II	8 CHIM/06	A	SCORE
			PHYSICAL METHODS IN ORGANIC CHEMISTRY	6 CHIM/06	A	
16	PHARMACEUTICAL AND TOXICOLOGICAL CHEMISTRY I	10		CHIM/08	B	SCORE
17	MOLECULAR BIOLOGY	7		BIO/11	B	SCORE
18	PLANT BIOLOGY - PHARMACOGNOSY	9	PLANT BIOLOGY	4/BIO15	B	SCORE
			PHARMACOGNOSY	5/BIO15	B	
FOURTH YEAR						
19	PHARMACEUTICAL TECHNOLOGY, SOCIOLOGY AND ECONOMICS, AND LEGISLATION	12		CHIM/09	B	SCORE
20	PHARMACOLOGY - TOXICOLOGY	9	FARMACOLOGIA	4 BIO/14	B	SCORE
			TOXICOLOGY	5 BIO/14	B	
21	INDUSTRIAL PRODUCTION OF MEDICINES	9		CHIM/09	B	SCORE
22	PHARMACEUTICAL AND TOXICOLOGICAL CHEMISTRY II	10		CHIM/08	B	SCORE
23	ADVANCED METHODOLOGIES IN PHARMACEUTICAL CHEMISTRY	10	COMPUTATIONAL DRUG DESIGN	CHIM/08	B	SCORE
			LABORATORY OF DRUG SYNTHESIS METHODOLOGIES	CHIM/08	B	
24	COMPUTER SCIENCE	4		INF/01	A	PASS/FAIL
FIFTH YEAR						
25	APPLIED PHARMACEUTICAL CHEMISTRY	9		CHIM/09	B	SCORE
26	ELECTIVE	8			D	PASS/FAIL
	APPRENTICESHIP	30			S	PASS/FAIL
	FINAL EXAMINATION	28			E	
	RELATED AND SUPPLEMENTARY ACTIVITIES - ORIENTATION CHOSEN BY STUDENT	12			C	PASS/FAIL
	CONCENTRATION IN BIOPHARMACOLOGY					

27A	PHARMACOLOGICAL METHODOLOGIES IN VIVO AND EXPERIMENTATION OF DRUGS	4				PASS/FAIL
28A	RECOMBINANT TECHNOLOGIES AND POST GENOMIC ANALYSIS METHODOLOGIES	4				PASS/FAIL
29A	PHARMACOLOGICAL BIOTECHNOLOGIES	4				PASS/FAIL
	CONCENTRATION IN PHARMACEUTICAL CHEMISTRY					
27B	BIOTECHNOLOGICAL DRUGS	4				PASS/FAIL
28B	CHEMISTRY OF DRUGS OF NATURAL ORIGIN	4				PASS/FAIL
29B	MOLECULAR MODELLING IN THE STUDY OF DRUG TARGETS	4				PASS/FAIL
	CONCENTRATION IN PHARMACEUTICAL TECHNOLOGY					
27C	PHARMACEUTICAL TECHNOLOGY METHODOLOGIES	4				PASS/FAIL
28C	EXPERIMENT DESIGN AND APPLIED STATISTICS FOR PHARMACEUTICAL TECHNOLOGY	4				PASS/FAIL
29C	VEHICLING AND DIRECTING OF BIOTECHNOLOGICAL DRUGS	4				PASS/FAIL
	CONCENTRATION IN FOODS					
27D	FOOD CHEMISTRY	4				PASS/FAIL
28D	CHEMISTRY AND TECHNOLOGY OF DIETETIC PRODUCTS	4				PASS/FAIL
29D	ANALYSIS OF POLLUTANTS IN FOOD MATRICES	4				PASS/FAIL

Other obligatory academic activities: Computer science proficiency 3 CFU; Professional apprenticeship 30 CFU. In total, 33 CFU.

Final Examination: 28 CFU.

Course attendance is obligatory.

The integration courses reserved for freshmen are held before the beginning of lessons. The schedule is published at Faculty President's Secretariat (Segreteria di Presidenza della Facoltà) and at the Student Registrar (Segreterie Studenti).

Registration, passages and transfers to the reformed Course will not be accepted if presented or received after November 5, 2009.

The order in which courses should be followed

The Faculty Council has established the following order in which courses should be followed.

Attendance and examinations for multi-year courses must respect the priority indicated by the number assigned the course.

Students are not allowed to take examinations for the disciplines listed in column **A** until they have passed the examinations listed in column **B**.

A

B

Biochemistry

Human Anatomy – Animal Biology (e.i.)

Organic Chemistry I
Drug Analysis I

General Inorganic Chemistry

Physical Chemistry
Physics

Matematica
Chimica Generale ed Inorganica

Biochemistry – Molecular Biology (e.i.)
Pharmaceutical and Toxicological Chemistry I

Organic Chemistry I

Physical Methods in Organic Chemistry

Organic Chemistry I
Physical Chemistry

Pharmaceutical and Toxicological Chemistry II
Pharmacology and Pharmacotherapy

Physiology

Physiology

Human Anatomy
Physics

Pharmacology and Pharmacotherapy

Microbiology – General Pathology (e.i.)

Drug Analysis II

Laboratory Preparation of Drugs by Extraction and Synthesis

Organic Chemistry I

Pharmacology and Toxicology
Plant Biology - Pharmacognosy (e.i.)

Pharmacology and Pharmacotherapy

Pharmaceutical Technology, Sociology and Economics, and Legislation
Applied Pharmaceutical Chemistry

Pharmaceutical and Toxicological Chemistry I
Pharmacology and Pharmacotherapy

For the other academic activities, be they obligatory or elective, the following order has been established.

Students are not allowed to attend the other obligatory academic activities and electives in column **A** unless they have attended the disciplines indicated alongside in column **B**.

<i>A</i>	<i>B</i>
<i>Research and Development of Food Supplements</i> <i>Recombinant Technologies</i>	General and Inorganic Chemistry Biochemistry Organic Chemistry
<i>Epidemiology and Prophylaxis of Infectious Diseases</i>	Microbiologia
<i>Planning and organization of healthcare services</i>	Epidemiology and prophylaxis of infectious diseases Diseases of Social Significance
<i>Food chemistry</i> <i>Chemistry of dietetic products</i>	Organic Chemistry I
<i>Methodological Approaches to Pharmaceutical Research</i> <i>Biopharmaceutical Chemistry</i>	Pharmaceutical and Toxicological Chemistry I
<i>Neuropsychopharmacology</i>	Pharmacology and pharmacotherapy
<i>Pharmacological Biotechnologies</i>	Pharmacology and Toxicology
<i>Receptor Chemistry</i>	Pharmacology and Toxicology Pharmaceutical and Toxicological Chemistry II

Teachers will ascertain that students observe the correct order in attending courses and taking examinations.

Students may take the exams of the third year program only after having passed all the exams of the first year program.

Teachers will ascertain that students have passed all their first year examinations before allowing them to take third year examinations.

Students whose attendance is in good order take the examinations that assess their mastery of the material taught in a didactic period, at the examination session concluding that period, or in the subsequent sessions, as established in the Faculty Council calendar.

The Faculty Council, for reasons related to didactics, may adopt intensive courses, organized in distinct cycles and with final examinations of the individual disciplines taught in the course of the academic year of registration.

In the case of partial examinations during the course (integrated examinations), the Faculty Dean forms the examination commissions, nominating the teachers of the courses according to the current regulations.

Students who so request will be registered for a repeat-year.

All the other Didactic Regulations of the University for registration remain in force for repeat-year registration as well.

Students who fail to advance in their degree in the time prescribed will be registered as "fuori corso". In particular, this category applies to:

- a) students who are registered and have attended all the lessons required for the entire course of studies, until they earn their academic degree;
- b) students registered for a year of their program of studies, and who have obtained the necessary requisites to register for the subsequent year, but have not requested and obtained this registration.

In order to be allowed to take the graduation examination, the student must have earned 245 credits for the various academic activities (obligatory and elective).

In addition, the student must have completed a six-month full time (6 hours a day) professional apprenticeship (pharmaceutical practice) for a minimum of 36 hours a week and for a total period of at least 6 months. This apprenticeship should take place during the fourth or fifth year of studies, or as a "fuori corso" student, at a pharmacy open to the public or a hospital pharmacy, in Italy. It should be completed in no longer than 9 month's time.

In addition, the student must prepare an experimental thesis on a subject agreed upon with a teacher of the Faculty.

Knowledge of scientific English will be verified by a pass/fail test.

Knowledge in computer science is not measured by a conventional examination; the student's competency will be assessed by tests *in itinere*.

Elective activities do not require conventional examinations. The student's mastery of the subject will be assessed by tests *in itinere*.

The graduation examination entails the presentation and defense of an experimental thesis on a subject agreed upon with a teacher of the Faculty, save in cases in which the Faculty Council authorizes an exception. For the experimental thesis, the student must be present in a scientific laboratory, preferably of the Faculty, for at least six months.

Students registered in the five-year degree program are subject to the laws and regulations regarding university students, for any eventualities not specified in this document.

For further information or clarification, contact:

- The Registrar (Segreteria Studenti) of the University of Camerino (Via Le Mosse, 69 - tel. 0737 / 404808 - 404807 - 404806), for administrative issues;
- The Secretariat of the President of the Faculty of Pharmacy (Piazza dei Costanti, - tel. 0737/402456 - e-mail: farmacia@unicam.it) for academic and organizational issues.