



UNIVERSITY OF MESSINA

## MASTER DEGREE COURSE IN PHARMACEUTICAL CHEMISTRY AND TECHNOLOGY

### MANIFESTO OF STUDY -ACADEMIC YEAR 2013-2014

**The Master Degree at one cycle in Pharmaceutical Chemistry and Technology belongs to the Class LM-13 Master Degrees at one cycle in Pharmacy and Industrial Pharmacy and has the objective of ensuring the graduates the scientific and theoretical and practical preparation necessary to practice as a pharmacist and to act as expert in drug and health products, its field industry.**

**By obtaining the master degree and related professional qualification, a graduate of the class exercises under the Directive 85/432/EEC, the profession of pharmacist.** In analogy to the training of other European countries, the 2<sup>nd</sup> Degree in Pharmaceutical Chemistry and Technology guarantee the theoretical and practical knowledge in chemical, biological, pharmaceutical and technologic fields essential both to approach in the pharmaceutical industry pharmaceutical the entire sequence of the complex multidisciplinary process of design, production and quality control of medicines, and to work in research and development of new synthetic or natural origin drugs. In any case, training should emphasize the methodological aspects to prevent the obsolescence of skills acquired. **The Master Degree in Pharmaceutical Chemistry and Technology may also access the state examinations for entry to the Section A of the Chemists Register(D.P.R. June 5 2001 n.328).**

#### ARTICULATION OF THE COURSE OF STUDY

- **The duration of the Master Degree Course in Pharmaceutical Chemistry and Technology is five academic years (300 CFU)**, including a period of professional training in a pharmacy open to the public, or in a hospital under the supervision of pharmaceutical services for 30 university educational credits (CFU) and a graduation thesis for 20 credits.

- The **University educational credit (CFU)**, hereinafter referred to as credit, **corresponds to 25 hours of work per student** that is so divided according to type of training:

- a) Lectures, seminar lessons for further study, theoretic-practical lessons, exercises in class (L) = 8 hours of frontal teaching and 17 hours of individual study
- b) Individual exercises in the laboratory (E) = 12 hours of frontal teaching and 13 hours of individual study
- c) 25 hours of project or study to prepare graduation thesis
- d) 25 hours of internship
- e) 30 hours of practical pre-degree professional activity

- **The teaching activities include basic, characteristics and complementary activities of the scientific-disciplinary areas required by Class LM-13** and is organized on the basis of mono-or integrated courses that can be divided into teaching coordinated modules taught by one or more professors and in a single examination or final assessment. Part of the practice can be carried out at external laboratories and centers under the responsibility of the owner of the course, after the conclusion of appropriate agreements.

- **The frequency of courses of the disciplines reported in plan of teaching activities of the Master Degree Course in Pharmaceutical Chemistry and Technology is required under Directive 85/432/EEC** and, therefore, there are no forms of exemption from participation in learning activities (Clause 6 of the Teaching Regulations of Master Degree Course in Pharmaceutical Chemistry and Technology). Absences are permitted for no more than 30% of the hours of Individual exercises in the laboratory and not more than 50% of hours of lectures, except in cases of proven need for a greater number of absences that will be assessed by the Council of the Master Degree Course in Pharmaceutical Chemistry and Technology. on submission of application duly substantiated. This application must be submitted no later than the academic year covered by the request. Any extension of time limits for entry to years of course beyond the first will not be taken into account in calculating the percentage of hours of teaching activity, as assessed in all their forms of completion, from attending to get the attestation of frequency at the end of the course. The student must therefore respect the teaching schedule and the date of start of the course, given the compulsory nature of the frequency. The determination of the frequency will be made as provided by Clause 6 of the Teaching Regulations of Master Degree Course in Pharmaceutical Chemistry and Technology.

- The Master Degree Course is articulated in the teaching activities listed in the plan. **There will be twenty-eight examinations, two tests and Master Degree examination.**

**EUROPEAN 2<sup>ND</sup> DEGREE COURSE IN PHARMACEUTICAL CHEMISTRY AND TECHNOLOGY**  
**ANNUAL PLAN OF TEACHING ACTIVITIES**

Y	D.P.	C.A.T.	I.A.	SDF	COURSES	CFU	L	E	S-P-T	LECTURERS
I	I	E			Physics and Elements of mathematic and statistic calculus	12	96		204	
			B	FIS/03	Physics	6	48		102	UMBERTO GIORGIANNI
			B	MAT/03	Elements of mathematic and statistic calculus	6	48		102	GAETANA RESTUCCIA
I	I	E			General inorganic chemistry and Elements of physical chemistry	14	112		238	
			B	CHIM/03	General inorganic chemistry	10	80		170	LUIGI MONSÙ SCOLARO
			A	CHIM/02	Elements of physical chemistry	4	32		68	GIOVANNA DE LUCA
I	I	E	B	BIO/16	Animal biology and Human anatomy	10	80		170	GIUSEPPE SANTORO
I	II	E	B	MED/07	Microbiology	8	64		136	ANTONIA NOSTRO
I	II	E	C	BIO/15	Pharmaceutical Plant Biology	8	56	12	132	ANTONIO RAPISARDA
			B	CHIM/01	Analytical chemistry	8	64		136	LUIGI MONDELLO
II	I	E	B	CHIM/06	Organic chemistry	10	80		170	GIOVANNI ROMEO
II	I	E	C	CHIM/08	Drug analysis I	8	32	48	120	ROSARIA GITTO
II	I	V			Language skills: English	5	40		85	
II	I	V			Computer skills	3	24		51	
II	II	E	C	BIO/10	Biochemistry and Applied biochemistry	12	96		204	UGO LEUZZI
II	II	E	B	CHIM/06	Advanced organic chemistry	6	48		102	GIOVANNI ROMEO
II	II	E	C	BIO/15	Pharmacogony	8	48	24	128	ENZA MARIA GALATI
II	II	E	C	CHIM/08	Drug analysis II	8	32	48	120	ANTONINO GAETANO VILLARI
III	I	E	B	BIO/09	Human physiology	6	48		102	ROBERTO RACITI
III	I	E	B	MED/04	General patology	6	48		102	GUIDO FERLAZZO
III	I	E	A	CHIM/06	Structural characterization of organic compounds	8	64		136	ROBERTO ROMEO
III	I	E	C	CHIM/08	Medicinal chemistry I	10	80		170	ALBA CHIMIRRI
III	II	E	C	CHIM/09	Pharmaceutical technology	10	48	48	154	CINZIA ANNA VENTURA
III	II	E	C	CHIM/10	Food chemistry	6	48		102	ANTONELLA COTRONEO
III	II	E	C	BIO/14	General pharmacology	6	48		102	MICHELE NAVARRA
III	II	E			Free credits	8	64		136	
IV	I	E	C	CHIM/08	Medicinal chemistry II	10	80		170	SILVANA GRASSO
IV	I	E	C	CHIM/09	Applied pharmaceutical chemistry and Industrial formulation of medicines	10	80		170	ROSANNA STANCANELLI
IV	II	E	C	CHIM/08	Drug analysis III	8	32	48	120	ROSARIA OTTANÀ
IV	II	E	C	BIO/14	Pharmacology and pharmacotherapy	10	80		170	FRANCESCO CIMINO
IV	II				Practical pre-degree professional internship	22			660*	
V	I	E	C	BIO/14	Toxicology	8	64		136	ANTONINA SAIJA
V	I	E	C	CHIM/08	Lab-based course on synthetic and semisynthetic preparation of drugs	8	32	48	120	ANNA MARIA MONFORTE
V	I	E	C	CHIM/08	Advanced medicinal chemistry and Pharmaceutical biotechnologies	10	80		170	MARIA LUISA CALABRÒ
V	II	E	C	CHIM/09	Italian and European pharmaceutical legislation	6	48		102	SILVANA TOMMASINI
V	II				Practical pre-degree professional internship	8			240*	
V					Experimental thesis	20			500	

**Legend:** Y= Years. D-P.=Didactic Period. C.A.T. = Credits acquisition typology: E= Examination; V=Verify. I.A.= Instructive activities: B= basics; C= distinctive; A= additional; AL=others instructive activities. SDF=Scientific-disciplinary field. CFU = Credits L= Lesson hours; E= Exercises in laboratory hours; S= Study hours; P= Study hours for experimental thesis; T= pratical pre-degree professional acrivty \*1CFU=30 hours Note Direzione Generale of MIUR prot. n.570 dell'11-03-11.

- **The credits corresponding to each teaching activity are acquired by the student with the passing of disciplines**, or through other forms for verifying the profit established by the Teaching Regulations of the Master Degree Course in Pharmaceutical Chemistry and Technology subject to quantification in thirtieths vote for the examinations and centodecimi for the graduation thesis defence, with possible praise.

Depending on the type and duration of the teaching have provided the following rules that determine successful completion of the course and the acquisition of credits allocated:

**a)** examinations (practical and / or written and / or oral), whose vote is expressed in thirtieths;

**b)** testings (practical and / or written and / or oral) to be resolved in the case of a positive outcome in a recognition of "fit" listed on the university student's personal record book.

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- The recognition of credits earned by students will be in accordance with clause 5 of the Teaching Regulations of the Master Degree Course in Pharmaceutical Chemistry and Technology.
- Students to sit for an exam must have fulfilled compulsory attendance obligation as laid down in article 6 of this Regulations.

**- The examinations must be taken in accordance with the following table:**

<b>THE EXAMINATION OF:</b>	<b>MUST BE PRECEDED BY THE EXAMINATION / EXAMINATIONS OF:</b>
• Analytical chemistry	• General inorganic chemistry and Elements of physical chemistry
• Organic chemistry	• General inorganic chemistry and Elements of physical chemistry
• Advanced organic chemistry	• Organic chemistry
• Drug analysis I	• Analytical chemistry
• Drug analysis II	• Analytical chemistry
• Structural characterization of organic compounds	• Organic chemistry
• Biochemistry and applied biochemistry	• Organic chemistry
• Human physiology	• Animal biology and Human anatomy • Biochemistry and applied biochemistry
• General pathology	• Human physiology • Microbiology
• Pharmacognosy	• Pharmaceutical Plant Biology • Organic chemistry
• Food chemistry	• Organic chemistry
• Drug analysis III	• Drug analysis I • Organic chemistry
• Medicinal chemistry I	• Biochemistry and applied biochemistry
• Medicinal chemistry II	• Medicinal chemistry I
• Lab-based course on synthetic and semisynthetic preparation of drugs	• Organic chemistry
• General pharmacology	• Human physiology
• Pharmacology and pharmacotherapy	• General pharmacology • General pathology • Medicinal chemistry II • Pharmacognosy
• Toxicology	• Pharmacology and pharmacotherapy
• Pharmaceutical technology	• Organic chemistry
• Applied pharmaceutical chemistry and Industrial formulation of medicines	• Pharmaceutical technology
• Advanced medicinal chemistry and Pharmaceutical biotechnologies	• Medicinal chemistry II I

**- The tests to be completed for entry to years of course beyond the first are:**

I year-II year	03/06 including compulsory examination of General inorganic chemistry and Elements of physical chemistry
II year-III year	06/12 including compulsory examination of Organic chemistry
III year-IV year	12/20
IV year-V year	18/24

The student who has not passed the exams required for entry to the following year, before the I autumn session, may enroll with the reserve. The reserve will be dissolved if, within the II autumn session pass the required examinations, otherwise must be registered as a repeat. Certificates of attendance of the courses of the first teaching period are valid and give the right to support the related examinations.

**- For students enrolled in previous academic years**, whereas it was reformulated the calendar of examinations pursuant to the resolution of the Academic Senate of the University of Messina, **the tests to be completed for entry to years of course beyond the first are:**

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I year-II year	03/06
II year-III year	06/12
III year-IV year	12/20
IV year-V year	18/24

The student who has not passed the exams required for entry to the following year, before the I autumn session, may enroll with the reserve. The reserve will be dissolved if, within the II autumn session pass the required examinations, otherwise must be registered as a repeat. Certificates of attendance of the courses of the first teaching period are valid and give the right to support the related examinations.

**- The student who has passed the exams required for entry to the following year but has not received all certificates of attendance must be registered as a repeat.**

- To the students who do not exceed even by repeated examinations scheduled for the continuation of his career, are applied the provisions in clause 28 of the RDA.

**- Upon entry to the third year of the course the student must submit to the Student Secretariat of the Department of Pharmaceutical Sciences and Health Products and a copy to the Coordinator of the course of study a plan of study which shows the procedures for the use of the 8 credits that are chosen by the student.**

- The framework of training activities offered **as credits to be chosen by the student**, includes, in addition to these disciplines in the curricula of other courses / degree courses of the University of Messina relevant to the objectives of the training course in Master Degree in Pharmaceutical Chemistry and Technology and not in the plan of study, the following subjects offered by the Department of Pharmaceutical Sciences and Health Products and available to all students enrolled in degree courses activated and incardinated in the above-mentioned Department. At the beginning of each academic year, the Council of the Department of Pharmaceutical Sciences and Health Products, in view of the choices made by students through the presentation of individual study plans, reserves the right to determine what disciplines activate the second teaching period. In the event that a discipline could not be activated, the student will be duly informed by the Secretariat so that students can make the option for a discipline on.

**- The student, in accordance with Directive 85/432/EEC, it must make during the fourth and fifth year, a total period of six months internship training at a pharmacy open to the public, or in a hospital under the supervision of pharmaceutical services for a commitment of 30 CFU.** The arrangements for completion of the placement and relationships with Pharmacies are regulated by special agreements between the Department of Pharmaceutical Sciences and Health Products of the University of Messina, the Order of Pharmacists and the ASL of the provinces in which they are situated Pharmacies interested in according to the Regulation for Professional Training in the Pharmacy of the Department of Pharmaceutical Sciences and Health Products, University of Messina.

- To be admitted to the final examination of Master Degree in Pharmaceutical Chemistry and Technology, the student must have acquired the credits of the plan of study.

- The student, in order to attain the title, it must overcome, in addition, the **Master Degree final examination** which consists in the discussion of a paper written in Italian, accompanied by an abstract in English, on a original topic of research mono-or multi-disciplinary, carried out under the guidance of a professor acting as supervisor, supported in the case of interdisciplinary research by a faculty co-supervisor, at research laboratories of the Department of Pharmaceutical Sciences and Health Products or other public or private laboratories, with which have been drawn up special conventions with the University of Messina. This master degree thesis will have developed all aspects of design and realization of the research carried out and any of the links with the current state of knowledge in one of the scientific disciplines of biological, chemical or medical fields. The Council of Master Degree Course will assign the supervisor, taking into account the preferences expressed by the student in the application form of the graduation thesis; the Council also will assign the member of the graduation examining board who challenges the graduate's dissertation, who, representing the Council's role will be to monitor the planning and execution phases of research.

**The written request by the student for the award of the supervisor to prepare for the graduate thesis must be submitted** to the Student Secretariat of the Department of Pharmaceutical Sciences and Health Products in a copy to the Coordinator of the Master Degree in Pharmaceutical Chemistry and Technology **during the fourth year after passing at least eighteen exams**, stating in order of preference ten professors of the biological, chemical or medical areas care and for each of them the scientific-disciplinary field. The Council of Master Degree Course in Pharmaceutical Chemistry and Technology will assign the supervisor, taking into account the preferences expressed by the student. If requests for a particular supervisor exceed the number of places available communicated by that teacher will take into account: 1) number of exams passed, 2) number of exams passed relating to subjects related to the scientific field of the supervisor required; 3) the arithmetic average of the votes of exams passed 4) arithmetic average of the exams related to the disciplines related to the scientific-disciplinary supervisor required.

### **PROGRAMMING OF ACCESS AND REGISTRATION**

**To be admitted to the Master Degree Course in one cycle in Pharmaceutical Chemistry and Technology need to be in possession of a diploma five-year upper of secondary school or other educational qualifications obtained abroad and recognized equivalent.**

To ensure the quality requirements laid down by the laws in force, taking into account the need to take advantage of highly specialized laboratories single seat, since Directive 85/432/EEC provides for a period of professional

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internship at a pharmacy open to the public or in a hospital under the supervision of pharmaceutical services, the Council of Master Degree Course, according to Article 2, paragraph 1 (letters a-b) of the Law of 2 August 1999 n. 264, there is a need to plan on. **The maximum number of students that can be admitted to the first year is set at 100 units, of which 2 are reserved for non-EU students. Admission to the course will be subject to a merit list prepared on the basis of the outcome of a screening test. The modalities of the selection process will be published in the Announcement of a competitive exam for the Admission to the Master Degrees of the class LM-13 - Pharmacy and Industrial Pharmacy, issued by the University of Messina.**

The requirements for students who intend to enroll in the Master Degree Course in one cycle in Pharmaceutical Chemistry and Technology are: Mathematics (proportions, percentages, roots, powers, logarithms, equivalents, equations of first degree); Physics (physical quantities, units and measurement systems); chemistry (the periodic system of elements, substances, elements, compounds and mixtures, the concept of chemical reaction, changes of state); Biology (basic cell and the main biomolecules). Focus on those skills tests for admission.

**The knowledge and skills required for access are positively verified with the achievement, in the test for admission to the course of study, the mark of 40/80. If verification is not successful, are assigned additional learning requirements (OFA), which will be acquitted by passing a test (this test will take place on the days indicated in the Announcement of a competitive exam for the Admission), or by passing the General inorganic chemistry and Elements of physical chemistry exam. This obligation must be fulfilled by the date approved by the Academic Bodies and published on the University website. The failure to perform the obligation additional learning involves the repetition of enrollment in the first year of the course.**

### TRANSFERS

It allowed the transfer to the **Master Degree Course in Pharmaceutical Chemistry and Technology** of the University of Messina only to students from courses of Master Degree in Class 14 / S - Pharmacy and Industrial Pharmacy or Masters Degree in Class LM-13 - Pharmacy and Industrial Pharmacy from another university. Students interested must make application to the Student Secretariat of the Department of Pharmaceutical Sciences and Health Products together with previously held career and official disciplines for which we sought validation of the examination and / or attestation of attendance by 30 September 2013.

### TUTOR

The tutoring service in the pipeline is structured to ensure that each registered a tutor of the course which plays a role in supporting personalized learning, especially useful for students who, for various reasons, (ie jobs) present greater difficulties than exams and need a clear program of studies and personal career. In addition to the tutors the Council of Master Degree Course in Pharmaceutical Chemistry and Technology has identified five tutors among the teachers, one for each year of the course, in order to support students in overcoming any problems peculiar year attended. All students (incoming or existing members) can take advantage of an information point at the office teaching website can provide information on the services available to them. It is also present in the Department of Pharmaceutical Sciences and Health Products, in which the course is hinged, a tutor for the disabled that mainly carries the address of the male and female students with a disability when entering university and support throughout the course of study, with the aim of identifying and designing the types of support needed for each student to carry out a profit on their course of study.

### STUDENT MOBILITY AND COMPLETED STUDIES ABROAD

The application, which must be given the disciplines that the student will follow abroad and universities or institutes where the teaching takes place, must be submitted to the Coordinator of Master Degree in Pharmaceutical Chemistry and Technology, together from investigations of managing the internationalization of the Department of Pharmaceutical Sciences and Health Products in the projects of student mobility within Europe and internationally. The Coordinator, on the basis of compliance with the provisions of the Teaching Regulations of Master Degree in Chemistry and Pharmaceutical Technology determines whether or not accept it, subjecting the decision to ratify the Council of Master Degree in Chemistry and Pharmaceutical Technology. For matters not covered in this article applies to clause 25 of the RDA.

### TEACHING ACTIVITIES SCHEDULE

I YEAR		
RECOVERY COURSE	23/09/2013	09/10/2013
I DIDACTIC PERIOD	15/10/2013	24/01/2014
II DIDACTIC PERIOD	24/02/2014	30/05/2014
II - III- IV - V YEAR		
I DIDACTIC PERIOD	01/10/2013	06/12/2013
	07/01/2014	24/01/2014
II DIDACTIC PERIOD	24/02/2014	30/05/2014

**WINDOWS EXAMINATIONS**

<b>EXAMINATIONS WINTER SESSION I CALL</b>	<b>27/01/2014</b>	<b>07/02/2014</b>
<b>EXAMINATIONS WINTER SESSION II CALL</b>	<b>10/02/2014</b>	<b>21/02/2014</b>
<b>EXAMINATIONS SUMMER SESSION I CALL</b>	<b>04/06/2014</b>	<b>20/06/2014</b>
<b>EXAMINATIONS SUMMER SESSION II CALL</b>	<b>23/06/2014</b>	<b>07/07/2014</b>
<b>EXAMINATIONS SUMMER SESSION III CALL</b>	<b>08/07/2014</b>	<b>25/07/2014</b>
<b>EXAMINATIONS AUTUMN SESSION I CALL</b>	<b>01/09/2014</b>	<b>12/09/2014</b>
<b>EXAMINATIONS AUTUMN SESSION II CALL</b>	<b>15/09/2014</b>	<b>26/09/2014</b>
<b>EXAMINATIONS AUTUMN SESSION III CALL</b>	<b>09/12/2014</b>	<b>22/12/2014</b>