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# Industrial Pharmacy Education

## The European reality



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# The Italian reality

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**Pharmacy**

**32** Universities in Italy

**Pharmaceutical  
Chemistry and  
Technology**

**28** Universities in Italy

**5-years** Master degrees

**Class LM13 Pharmacy and Industrial Pharmacy**

**Admission: no limited enrolment at National level**

**but**

**local programmed number in almost all universities**

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# Pharmaceutical Chemistry and Technology (CTF)

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- approved by law in 1967 (**DPR 1037/67**).
  - 1969: first CTF degree course started at the University of Pavia.
  - Admission to the State Examination and membership of the Board of Pharmacists allowed since 1972 (**DPR 739/72**).
  - Revision of MDs Pharmacy and CTF (*DM 31.10.1988; DM 30.05.1995; DM 04.08.2000; DM 28.11.2000*)
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# Subjects (CEE 85/432)

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Plant and animal  
biology

Physics

Anatomy and  
Physiology

General and  
inorganic  
chemistry

Organic  
Chemistry

Analytical  
Chemistry

General and  
applied  
biochemistry

Pharmaceutical  
Chemistry and  
drug analysis

Toxicology

Microbiology

Pharmacology  
and  
Pharmacotherapy

Pharmaceutical  
Technology

Pharmaceutical  
legislation and  
deontology

Pharmacognosy

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# Pharmaceutical Chemistry and Technology differences with Pharmacy

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## Basic scientific subjects

- Physical chemistry
- Organic Chemistry
- Physical methods in organic chemistry

## Professional subjects

- Food Chemistry
- Laboratory of drug extraction and synthesis
- Drug release and targeting
- Regulatory affairs
- Industrial Manufacture of medicinal products
- Experimental Pharmacology

**Compulsory experimental master thesis in CTF**

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# Pharmaceutical Chemistry and Technology

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## The MD is multidisciplinary and provides the following:

- training in the basic scientific disciplines (mathematics, physics, chemistry, biology), providing students with solid theoretic and practical skills in the main subject areas
  - in-depth chemical, pharmaceutical, biochemical and pharmacological training required for the design and development of new biologically active molecules
  - scientific and technological knowledge needed for the design, development and testing of dosage forms for medicinal and health products
  - expertise with the national and supranational rules concerning medicinal and health products
  - planning and operational skills required to carry out research in the key sectors covered by the MD program; education is provided as part of the master thesis, which must be experimental.
  - professional knowledge required to practice pharmacy under the national health service, training through practice internship (directive 85/432/ECC)
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# Course Structure

- Lectures
- Laboratory Teachings
- Individual Laboratory Work
- Computer skills and language skills courses
- Pharmacy Practice
- Preparation of an experimental master thesis, under the supervision of an advisor, in a national or international laboratory
- Defense of the thesis



# Professional practice

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- To graduate in Pharmaceutical Chemistry and Technology, students must successfully complete a 6 month-period of Pharmacy practice (30 ECTS, 900 hours).
- The practice period is performed under the supervision of a professor from the University as well as a professional supervisor from the community or hospital pharmacy.





# Master Degree in Pharmaceutical Chemistry and Technology

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**offers**

Technical and practical knowledge in the field of chemistry, biology, pharmaceuticals, toxicology, pharmaceutical chemistry, pharmaceutical technology and regulatory affairs.



**creates**

A professional whose main field of expertise is  
Pharmaceutical Industry

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# Pharmaceutical Chemistry and Technology

## Career opportunities

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**According to directive 2005/36/CE, graduates are trained and educated to work as researchers in the pharmaceutical industries and research centers:**

- Research departments in the pharmaceutical industry
  - Quality assurance departments in the pharmaceutical industry
  - Quality control departments in the pharmaceutical industry
  - Regulatory affair offices
  - Medicines wholesalers and drug distribution
  - Government pharmaceutical services
  - Medical representatives
  - Pharmacists in community and hospital pharmacies
  - regulatory affairs
  - quality assurance, validation of production processes
  - staff training, inspections
  - scientific information specialist
  - clinical research
  - marketing
  - pharmacovigilance
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# Master Degree in Pharmaceutical Chemistry and Technology

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## Privileged position in

- pharmaceutical research and development
  - production supervisor
  - department heads (pharmaceutical production: solids, parenterals, liquids, semi-solids packaging....)
  - quality control
  - logistics, planning, purchasing, distribution
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# Master Degree in Pharmaceutical Chemistry and Technology

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## Privileged position in

- regulatory affairs
  - quality assurance, validation of production processes
  - staff training, inspections
  - scientific information specialist
  - clinical research
  - Marketing
  - pharmacovigilance
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# Both Pharmacy and CTF

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graduates to register

- in the Pharmacists' board after passing the qualification exam for the pharmacist profession (State exam)
  - in the Chemist'board after passing the State examination for Chemist profession
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