



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II



**Politecnico
di Torino**

MSc Course in **Industrial Chemistry for Circular and Bio Economy**

Industrial Chemistry is the manufacturing art concerned with the transformation of matter into useful materials in useful amounts



Circular and Bio Economy is the sustainable, resource-efficient valorization of waste, residue and biomass in integrated multi-output production chains



The transition to a more 'green' and environmentally sustainable economy requires **new education and training systems** to support the overall process.

The role of vocational education in enabling the transition is part of the European Green Deal, the United Nations' Sustainable Development Goals (SDGs) and country targets of net-zero carbon emissions. **"Contamination of knowledge" is fundamental**, and it is especially so in the training courses of the new generations.

This Master degree offers extensive training programs for **professionals interested in working within the bio-based goods and services industry**. The Master's degree course in **Industrial Chemistry for Circular and Bio Economy** aims to train figures with transversal skills in Industrial Chemistry, Biotechnology, and Circular Economy together with professional training that will cover the new needs of the European chemical industry.



The urgent paradigm of **sustainable growth** and **circular economy** strongly involves the **chemical industry**. The concepts of green chemistry, green chemical engineering, products obtained from renewable raw materials or wastes are now central for the development of the future chemical industry.

This new approach requires the involvement of a new generation of scientists/technicians/managers with the right training and skills.

This degree aims to train these new professional figures offering a training course in which skills of Industrial Chemistry, Chemical Engineering and Industrial Biotechnology are strongly integrated

The MSc Course at a glance

The degree is offered jointly by the **Iniversità di Napoli Federico II** and the **Politecnico of Torino**.

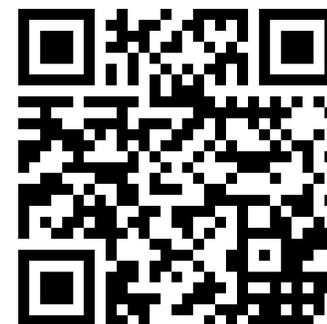
The course is in **English** and in mixed form (10-25% MOOC, 5-20% Distance Learning Courses).

The synergy between **UNINA** and **POLITO** is also consolidated by the different economic-industrial context that will allow a transfer of skills and knowledge between the two territories.

The contact with the two territories, mediated by the joint University-Industry training actions (**Challenge** and **Degree Thesis**), will allow the birth of new integrated and circular production paths.

The course has a strong **international vocation**, being the two locations a pole of attraction for students from both **northern Europe** and **Mediterranean area**.

The idea of the new joint degree course is based on the existing relationships between research groups of **UNINA** and **POLITO**. Their complementary skills will be put into a system for the creation of a training offer that would meet the new needs the chemical industry.

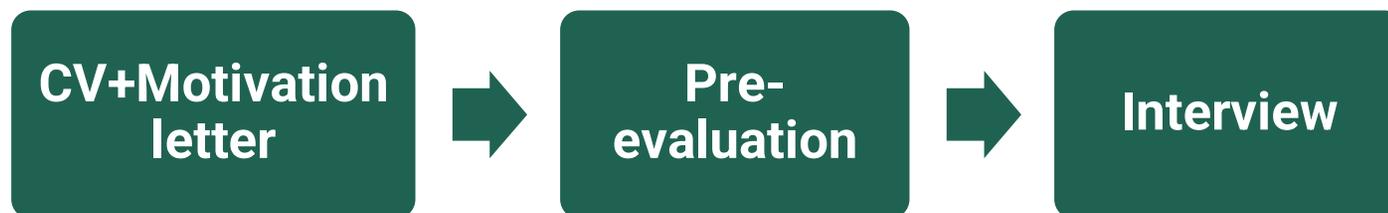


Enrolment procedure

- ❑ Enrolment is limited to a maximum of **30 participants**.
- ❑ **Certified English language** proficiency at the **B2 level** is required.
- ❑ Admission is permitted if at least 1 of the following curricular requirements is met:
 - ✓ Requirement 1: Candidates who have graduated in Italy, class L-27 Chemical Sciences and Technologies.
 - ✓ Requirement 2: Candidates with an Italian degree in classes L-2 Biotechnology or L13-Biological Sciences, but who have acquired the following CFU:
 - 8 CFU in the subject areas: MAT/01 to 09
 - 6 CFU in the subject areas: FIS/01 to 08
 - 15 CFU in the subject areas: CHIM/01 to 07
 - 15 CFU in the subject areas: AGR/16, BIO/10, BIO/11, CHIM/11, ING-IND/25, ING-IND 27.
 - ✓ Requirement 3: candidates with a foreign university degree with a curriculum corresponding, in terms of content, to requirements 1 or 2 indicated above.

Enrolment procedure

- ❑ Verification of personal preparation is mandatory in all cases, and only students who meet the curricular requirements may enter.
- ❑ Candidates for enrolment in the degree program who meet the admission requirements submit their curriculum to the CCD. The CCD, after verification of the requirements, admits the candidates to the personal preparation evaluation and motivation.



What will I learn?

- ❑ In-depth preparation for the development of new processes and products in a perspective of Circular and Bio Economy.
- ❑ How to operate, respecting ethical constraints, especially in the field of research and development.
- ❑ Tools to develop, manage and evaluate products, materials, and processes at an industrial scale.
- ❑ How to work within the constraints of sustainable chemistry.
- ❑ In-depth professionalism to be used in the job market, via challenges and thesis in companies.



The study programme – YEAR I.I

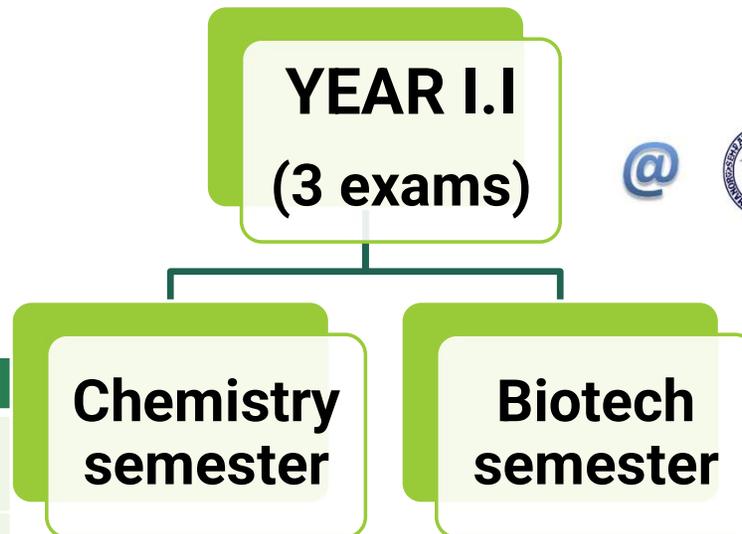
- ❑ Alignment courses are provided in a mixed mode (MOOC+FRONTAL).
- ❑ MOOCs will be provided on the **Federica Web Learning** platform -



 **Federica**
Web Learning
Università di Napoli Federico II

The study programme – YEAR I.I

- Since the Course of Study is expected to enroll students with different cultural backgrounds, **two alignment paths** are provided to ensure the achievement of the specific objectives of the training path.



YEAR I - SEMESTER I

Complements of Physical and Analytical Chemistry	CFU 11 (6+5)
Complements of Inorganic and Organic Chemistry	CFU 10 (5+5)
Circular Platforms for energy and materials Recovery	CFU 10 (5+5)

YEAR I - SEMESTER I

Bioinorganic Chemistry and Industrial Enzymology	CFU 11 (6+5)
Complements of Microbiology and Biotechnology	CFU 10 (5+5)
Circular Platforms for energy and materials Recovery	CFU 10 (5+5)

The study programme – YEAR I.II

YEAR I.II
(5 exams)

YEAR I - SEMESTER II

Industrial Chemistry	CFU 8
Polymers: production, recycle and characterization	CFU 6
Green Unit Operations	CFU 9
Industrial Biotechnology	CFU 7
Additional language skills (Italian) or further knowledge of computer science	CFU 3



The study programme – YEAR II

**YEAR II
(4 exams)**

YEAR II - SEMESTER I

Green plants design	CFU 11
Industrial green simulation process	CFU 7
Elective course	CFU 6
Elective course	CFU 6



or Challenge

**Traineeship
and Thesis**

YEAR II - SEMESTER II

Traineeship	CFU 4
Thesis	CFU 22



Traineeship

- ❑ Internships/training stages at organizations or companies that have an agreement with the University.
- ❑ Main websites dedicated to traineeship:
 - ✓ Università di Napoli Federico II:
<http://www.orientamento.unina.it/tirocini-per-iscritti/>
 - ✓ Career Service Office (POLITO):
<https://careerservice.polito.it/studenti/tirocini>



Thesis

Thesis can be done once students have acquired **60 CFU**.



Career orientation and job placement

- ❑ The portal **Orienta UNINA** (<http://www.orientamento.unina.it/placement/>) has a special section in which recruitment events, job fairs and opportunities for job placement are reported by companies.
- ❑ **Jobservice portal** (<http://www.jobservice.unina.it/it/>) lists job vacancies of several companies.
- ❑ The Politecnico di Torino centrally manages, through the Career Service office, all the connection activities between the students and the world of work. In this context, there are active programs of accompaniment to work, the details of which are illustrated and available on the website (<https://careerservice.polito.it/>).

Job Opportunities

- Chemical/biotechnological/pharmaceutical industries
- Recycling or waste treatment plants
- Private and public chemical/biotechnology laboratories
- Public administration offices/control bodies
- Activities as professionals after obtaining the Qualification and enrolment in the Register of the Orders of Chemists and Physicists



Contacts and Info

WEBSITE <http://www.scienzechimiche.unina.it/iccbe>



Referents

- UniNA: Prof. Martino Di Serio (diserio@unina.it)
- PoliTO: Prof. Fabio De Orsola (fabio.deorsola@polito.it)

Social networks



iccbe.msc